The Automobile Club of America.

Good Reading about Automobiles, Motors and Cycles, and the People who Make and Use Them

VOL. I NEW SERIES No. 5

MOTOR AGE

With Which is Incorporated THE CYCLE AGE

Subscriptions
Domestic, $2.00
Foreign, $4.00
Single Copies,
Five Cents

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CHICAGO, JANUARY 30, 1902

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The Motor Age

A budget of good reading about Automobiles, Motors and Bicycles, and the people who make and use them.

Motor Age and Cycle Age

MOTOR AGE, with which is incorporated CYCLE AGE, is published every Thursday at rooms 400-409 Monon building, 324 Dearborn street, Chicago, by Samuel A. Miles. It is entered at the Chicago postoffice as second-class matter.

* * *

The domestic subscription price is $2 a year; foreign subscriptions, $4 a year; single copy, 5 cents. The advertising rates, based on a guaranteed circulation of 5,000 copies, are as follows:

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* * *

The circulation of last week's issue was 5,150 copies. 4,755 copies, weighing 966 pounds, were mailed, as shown by the postoffice receipt. The remainder were distributed by the Western News Co. and the employes of the paper.

* * *

The postoffice receipt for the week, which will enable any one to check the circulation, is as follows:

No. 290A. POSTOFFICE AT CHICAGO, STATE ILL.
Date Jan. 29, 1902.
Name of publication, MOTOR AGE.
Total subject to postage at one cent per pound.....$9.66
Received full prepayment of postage.
(Signed) F. E. COYNE, P. M.
By Mills.

The editor will be glad to receive communications for publication. They must be accompanied by the names and addresses of senders, which will not be used if request be made to that effect. Contributions will not be paid for unless accompanied by notice that payment is expected.

New York News and Comment

NEW YORK, Jan. 26.—The committee of the automobile club which went to Albany Wednesday received an unexpected set-back. Members of the law committee and others were to have accompanied them; but at the meeting of the governors the preceding afternoon it was decided that the president and vice-president only should go. It was thought to have been arranged that the hearing on the Robinson assembly bill should be held at 2 o'clock and on the Cocks bill an hour later. The A. C. A. deputation was unable to successfully oppose the opposition's arguments, for the committee favorably reported the Robinson bill raising the speed limit to 20 miles in the country and making violations of it misdemeanors punishable by a maximum fine of $100 and a maximum imprisonment of 20 days. The hearing on the Cocks bill, which leaves the old speed limits as they were at 8 and 15 miles, but makes violations of them misdemeanors punishable by $500 fine and a year's imprisonment as maxima, had been held before the arrival of the committee.

* * *

The surprise of the day was the appearance of Edward Pidgeon, as a delegate from the Long Island Automobile Clubs, to favor both bills. Some warning, however, might have been had from a press sheet sent out by the Long Island Automobile Club press committee a day or two previous stating, with the word "unofficially" in parenthesis, that the club members approved of the Cocks and Robinson bills and adding, "The future of automobilism is being determined at this time, and as the highways are for use jointly by horse drivers and automobilists, each must be protected."

* * *

"Automobilists who intend to obey the law," said A. R. Pardington, a L. I. C. A. governor, "have nothing to fear from any penalty imposed for violation of it. Our club is really the home club of the counties from which the proposed legislation emanates. We must keep on the best of terms with the citizens and authorities as a matter of good policy and for the sake of our own privileges in touring the district. All our contests and races have been run with due regard to the laws and we propose to maintain our standing as a law respecting association."

* * *

"I do not care to discuss the matter," said G. F. Chamberlin, chairman of the A. C. A. law committee. "I think it unfortunate, though, that some of the Long Island club members take this view of it. Their law committee, Judge Church, does not favor these bills. If we give the unfriendly legislators an inch in this matter of unreasonable statutes they will take an ell. I am sure, though, that in the end no one will be hurt and that everything will be satisfactorily adjusted at

the second hearing next Wednesday, which the law committee and many members of the club will also attend this time."

* * *

There are some who attribute this pulling in opposite directions of the two clubs in this matter to an underlying and carefully blanketed unfriendly feeling on the part of the Long Island clubmen against the New York club as represented by the present administration. The L. I. A. C., with its customary hustle and enterprise, inaugurated last spring the hundred mile endurance run idea and in the autumn was the first promoter of the straightaway short distance time trials, which latter attained such world-wide fame that they have been imitated extensively abroad. It is suspected that the Long Islanders do not fancy overmuch and perhaps do not consider it "clublike" for the New Yorkers to have also announced an hundred-mile endurance run and straightaway time trials at a mile and a kilometer, as they have done for May 30 and 31. The Brooklyn club is also a strong opponent of President Shattuck's affiliation idea, though it says it will refuse to join in the call of the Chicago Automobile Club for a national convention until the pioneer club has been given further chance to abandon its affiliation scheme and co-operate in a national movement along representative lines.

* * *

It was hinted that the affiliation versus national association discussion would come up at the meeting of the A. C. A. governors called for yesterday afternoon. No quorum, however, was present and Secretary Butler told the MOTOR AGE man that there was nothing further to be given out on the subject yet. We outsiders here are still ignorant of the contents of Mr. Shattuck's alleged letter to the Chicago club or of the latter's action on it, if such a letter has been received or any action has been taken. There seems to be a feeling in A. C. A. circles that the difference with the C. A. C. is in the way toward speedy adjustment. There seems to be a most courteous and respectful inclination on the part of the easterners to give the A. C. A. every chance to mend its fences and come into a national association before taking any out and out action toward engaging in such a movement. When all hope of the A. C. A. co-operating in a national association is abandoned it is safe to say that there will be a cessation of this bowing with hat in hand, "after-you-sir" attitude now adopted by the eastern opponents of affiliation and a quick adoption of the Chicago club's admirable and characteristic suggestion of a convention with or without the New Yorkers. In all the history of sporting discussions and national movements there has never been a parallel to the courtesy and indulgence displayed to a pioneer organization as in this case. The A. C. A. has good reason to be highly complimented by it, but it should also teach the club the good sense of accepting gracefully the opportunity to retreat from the position in which it has been put by President Shattuck's persistence in an unpracticable, unreasonable, untenable and un-American solution of the problem of national automobile unity and government.

* * *

[The president of the Chicago club has not received the communication reported last week to have been sent by the New York club and referred to above.—EDITOR.]

* * *

The highway improvement committee of the triple alliance of automobilists, horsemen and cyclists, of which President Shattuck, of the A. C. A., is chairman, met with much encouragement at their hearings this week before the borough presidents of Manhattan and the Bronx. President Cantor, of the former, expressed sympathy with the movement and promised to call the immediate attention of the street boards to the matter. President Haffen, of the latter, showed an equal readiness to carry out the suggestions made as to repairs and new roads. These in both cases were presented in writing accompanied by marked maps. The triple alliance is attracting much public notice and promises to be a powerful agent for good roads, well worthy of imitation by the formation of similar alliances of all highway using associations in other cities.

* * *

On February 11 Prof. Sheldon will speak before the A. C. A. on The Storage Battery. For the Tuesday talk of March 11 Secretary Butler announces that Prof. Hutton, who is head of the mechanical engineering department of the Columbia University and also secretary of the American Society of Mechanical Engineers, will deliver a lecture on Some Fundamental Plans Underlying the Design of Automobiles.

Chicago Club Has Not Heard from New York

Eastern people seem to be under the impression that correspondence has been in progress between the New York and Chicago clubs with a view to remedying the faults found by the latter in the proposed affiliation scheme. The facts are that no such correspondence has occurred and that since receipt of the original proposition no word of any kind has been received by the Chicago club from the New Yorkers.

Last week the New York club sent out the form of contract by which it expects the affiliating clubs to be bound. It is nearly a repetition, in more formal language, of the original proposition. The only part of it of the slightest interest is the clause relating to the racing rules, which is in form as follows:

The second party agrees that in all races and contests held under its authority it will first secure the license required by the racing rules and regulations of the first party, and that it will be governed exclusively by such rules, a copy of which may be procured from the first party.

Each party agrees with the other that should any one taking part in any such race or contest be disqualified by either party for any cause whatsoever, the disqualification of such person shall be binding upon the parties hereto, subject to the provisions of the racing rules; provided notice to that effect be given.

Cleveland Club Will Seek Members

Cleveland, January, 1902.—The Cleveland Automobile Club is planning an active summer season. Heretofore small membership has been accounted for by the dues of $50 and the initiation fee of the same amount, which is somewhat steep for the advantages offered. The officials now propose to boom things and, to gather in all desirable owners, will reduce the dues to $10, and the initiation fee to the same amount. It is the plan to secure large enough membership to warrant securing a neat little club house, on the lake shore, a few miles east. It is also planned to run a series of race meets. The club will hold its annual meeting in the near future.

There are plenty of indications that the interest in automobile racing will surpass anything that has heretofore been experienced in this section. Last year there was considerable rivalry as to who was the possessor of the fastest machine. There were a number of semi-racers, but with the exception of Winton, no one owned an out and out flyer. The coming season the situation will be different. Two or three Winton racers will be owned besides two or three high speed machines being built by other local manufacturers, not to mention several foreign flyers, one of which is already in use, and another on the way. Will Runyun owns the first mentioned, a Panhard of uncertain horsepower and speedy appearance. The other is expected almost daily by Will

Rainey. It is a 40-horsepower Panhard and it is said that there are only three like it in existence, one of which is owned by the King of Belgium. It is understood that Roy Rainey, a younger brother of the above, is figuring on duplicating the order.

Thomas H. White, president of the White Sewing Machine Co. and one of Cleveland's wealthiest citizens, was married a few days ago at St. Augustine, Fla., to Mrs. Elizabeth Brennan.

Frank B. Stearns of the firm of F. B. Stearns & Co. was married a few days ago to Miss Florence Wilson, an East End belle. The ceremony was a decided society event. Mr. and Mrs. Stearns will be at home after Feb. 18. They are now on an extended wedding trip.

Automobile Miscellany

Charron and Rene de Knyff have stated that they will not participate in the Nice-Abbazia race to be held April 2 to 9, the latter speaking for the Panhard company, and the former for the concern of which he is a member. Charron, in declining to enter, gives as his reason that the announcement of the race was not made in time to allow of the prospective entrants becoming familiar with the course, and the likelihood of the course being covered with snow. Other prominent makers, however, are enthusiastic over the event, Serpollet having wired the entry of eight steam vehicles. He and his wife will take part in the tourists' run. Darracq has entered five vehicles so far and may enter more. Other prominent makers will undoubtedly take part. Baron de Catero has entered an 80-horsepower machine.

The Automobile Club of America has just issued a hand book containing its constitution, racing rules, list of members, etc. Among other things it contains is useful information relative to the highway laws of New York, Connecticut, New Jersey and Massachusetts, the gasoline ferry law and a list of ferries which will not carry automobiles which use gasoline. A list of the automobile clubs of this and foreign countries is also furnished.

The Marseille-Paris road race will take place May 18 and 19. This race is organized by Auto-Velo, which paper offers prizes to the amount of $2,100 to professionals, of which $1,200 goes to the winner. The amateurs will have $590 to divide in works of art. No automobile will be allowed to follow the riders as was done last year, nor will pacing be allowed except by cycles. The distance is 575 miles.

England and France only will be represented in the famous international event contested annually for the Coupe Internationale. Entries closed the last day of 1901 and although America and other nations had talked of sending representatives, only the two countries mentioned qualified. There was some dispute over the limiting the weight of vehicles to 1,000 kilos, but it was finally allowed to stand.

Application blanks for space at the international automobile exhibition to be held at Copenhagen, Denmark, April 11 to 27, have been received by MOTOR AGE. Beside allowing all vehicles intended for the exhibit entry into the country free of duty, and providing space free of charge, insurance will be placed on all exhibits without cost to exhibitors.

One of the features of the Chicago show will be a racing machine similar to that used last year. The same machine will be used at Detroit. It will be fitted with Moffett roller bearings kindly supplied by the makers and will be erected by Mr. Camp, formerly of the same company.

The postal authorities of Paris have tried the automobile in the service and have become so satisfied with the results that they have placed orders for thirty more vehicles. The Belgian service has also added ten for carrying the carriers to outlying districts through which they deliver mail.

The king of Italy has just passed an examination, before the commissioners of police, and has received his license to operate a vehicle in the Eternal City and elsewhere, as he desires.

The exportation of American automobiles last year amounted to $300,000 in value and the imports to $90,000. This fact ought to silence the croakers.

Emperor William has just purchased a Mercedes vehicle of 16 horsepower, of the tonneau type. It is finished in princely fashion.

The world's championship cycle races will take place in Rome, July 13, 17 and 20.

Long Island Club's Programme

In a letter to MOTOR AGE, dated Jan. 20, A. R. Pardington, chairman of the Long Island Automobile Club's press committee, outlines the club's plans as follows:

On April 20, 1901, under most unfavorable climatic conditions, the Long Island Automobile Club held the first event of its kind in this country, a one hundred mile non-stop endurance test. A large entry list qualified, and a most satisfactory showing was the result. While this event was in progress the club was importuned to repeat it. At its conclusion the board of governors announced that the event would be an annual one. From time to time since then re-announcement has been made. The board of governors takes pleasure in announcing Saturday, April 26, as the date set for the event this spring. The endurance test will include a hill-climbing contest on Roslyn hill, as a portion of the day's program.

President William Wallace Grant has named a special committee to conduct the event, viz., the board of governors, the technical committee and the good roads committee. This reposes the preliminaries and final plans in the care of a number of members who were instrumental in making the 1901 event the success that it was. Awards will be made on percentage basis, as before, and certificates of efficiency will be awarded. Silver cups will be awarded to the winners of the hill-climbing contest.

The course will be approximately over the same roads as in 1901, and the legal speed limits of 8 and 15 miles will be strictly adhered to, any excess meeting with disqualification as in 1901. This club was the first to effectually disqualify for non-compliance of the speed limits established both by law and by the club. Full and complete details, including conditions, entry blanks, instructions to timers and operators, will be put into the mail on February 1. The technical committee is now at work, so amending the constitution as to render eligible steam vehicles. The laying out of the course and reporting of conditions of the highways has been assigned to H. B. Fullerton, chairman of the good roads committee, who has recovered from his recent injury and resumed his duties at the club.

No action has been taken on the matter of affiliation. None is likely for the present, as the club is opposed to any organization which does not comprehend the A. C. of A., nor does it agree to the propositon as made by the A. C. of A.

Five new members were elected at the last meeting of the board of governors, viz., Messrs. Mollenhauer, Pratt, Greer, Page and Pratt.

Having declared itself against excessive speed on the highways, the club members, unofficially, approve of the bills introduced by Senator Cocks and Assemblyman Robinson, making such excessive speed a misdemeanor and consequently punishable. The future of automobilism is being determined at this time, and as the highways are for use jointly by horse drivers and automobilists, each must be protected.

THE SAFETY VALVE IS WIDE OPEN

And Whitney Asks Court to Apply Brakes to Stanley's Machine —Patent Litigation in Which Interests of Steam Vehicle Makers are Involved

A SUIT which may, and indeed is quite likely to prove of great importance to the steam vehicle industry, is that filed by the Whitney Motor Wagon Co. against the Stanley Bros., of Newton, Mass. The trade is already familiar with the fact that the Stanley patents are those under which the Locomobile company commenced business and that they are owned by that concern. It is not so well known, however, that the Locomobile people also control the Whitney patents.

Mr. Whitney, although generally referred to as a builder of automobiles is not really a manufacturer for the market. He has probably made as many machines of an experimental character as any man in America and it is claimed for him that he is the pioneer steam carriage builder of this country. It is further asserted that the patents taken out by him fully cover the greater part of the present steam carriage construction of this country, hence their purchase by the Locomobile company, despite the earlier payment of a quarter of a million dollars for the Stanley patents, which the present suit aims to show, were of the nature of a "gold brick." The Locomobile company is protected by or, if it prefers, can bring suit under either or both of the patents. If it is behind the present litigation, as seems probable, it has adopted the former plan.

The Stanleys have continued to manufacture carriages which the Locomobile company asserts infringe the patents which it owns. Hence the suit of Whitney against Stanley, filed last week, in which the former asks for an injunction and an accounting. The contention is that the Stanley wagon is an infringement of the original Whitney wagon, which was first manufactured in September, 1896. In that year Whitney turned out what is claimed to be the first steam wagon made in this country. He propelled it to New London, and from there shipped it to New York by boat. The following year he built an improved wagon for G. B. Upham, one of the parties interested in the suit. The latter wagon was displayed at the bicycle exhibition held in Mechanics' building, Boston, that winter. The wagon was propelled around the floor of the balcony in Manufacturers' Hall.

This machine is to play a prominent part in the litigation. The contention is that the Stanley brothers had ample opportunity to inspect the wagon while it was in Mechanics' building; that the Stanley motor vehicle was not produced until after the Whitney wagon had been exhibited, and that the Stanley wagon is a close copy of the Whitney, both in a mechanical and in a general way; that it possesses the same number of tubes to the boiler, has practically the same boiler, and is, in fact, practically a duplicate of the Whitney wagon.

The application for an injunction is returnable to the United States circuit court in Boston on the first Monday in March. The Whitney company has retained F. H. Betts, of New York, as senior counsel, and F. L. Emery, of Boston.

Cleveland News About Olds and Packard

Cleveland, Jan. 28.—The Oldsmobile Co., which was recently organized in this city, has placed what is, possibly, the largest contract for automobiles ever given by an agent. The company will cover Ohio and New York state for the Olds and has agreed to dispose of 1,400 of these machines. As has been previously stated, the company has a store in New York in charge of R. M. Owen, and one here managed by R. R. Owen. The latter has recently established good agents in the leading cities of the state, among them the following: Toledo Motor Vehicle Co.; Kaiser & Co., Dayton; Bethel Mobile Co., Cincinnati, and Avery & Davis, Columbus.

The Cleveland store, 411 Euclid avenue, occupies the entire basement of the old C. A. C. building, about 150x75 feet, divided into a storeroom for rental vehicles and "boarders," repair shop, sales room, office, waiting room and stock room.

Changes in the Olds are small improvements rather than radical departures. The front axle has been made stronger and a brake is placed inside the differential. The brake on the motor will be used as an auxiliary. The seat has been made wider and fenders will be furnished when desired.

A machinery dealer of this city has arranged to sell the complete equipment of the Boston Roller Bearing Co., Boston, including much machinery adaptable for automobile work. The Standard Roller Bearing Co. of Philadelphia has bought all the patents and special machinery of the company and will practically succeed to its business.

Hosste & Sons, East Madison and Superior streets, formerly prominent as bicycle builders on a small scale, have arranged to handle all repairs on Packard vehicles owned in this city, and incidentally will do general repair work. George L. Weiss, of 75 Ingleside avenue, is identified with the Ohio Automobile Co. of Warren, manufacturer of the Packard, and represents the company in this city. He is extremely popular in club circles and has already sold a number of machines for spring delivery.

To Represent a French Manufacturer

NEW YORK, Jan. 27.—Your correspondent learned today, on apparently good authority, that a wealthy American at present in Europe has arranged to represent one of the largest French factories and that a gentleman very well known in the industry in the neighborhood of New York will manage the business. The story further says that an order has been placed for 100 machines and that shipments will commence in about six weeks. The gentleman referred to as the manager was not visible today to affirm or deny the story.

Hopes to Supplant the Carette

One of the most painful sights in the city of Chicago for many years, has been the carette service which is provided with vehicles whose construction would have reflected no credit on the artisans of hundreds of years ago, drawn by unfortunate beasts whose appearance indicate that they have long ago outlived their usefulness for any other purpose and that they ought to have been consigned long ago to the place where good horses are supposed to go. All this is to be changed, or at least, fond hopes in that direction are entertained, by reason of the announcement that a line of vehicles will be operated by the Chicago Motor Vehicle Co. These are to carry eighteen passengers apiece and their general characteristics will be similar to those of the machines the company has been developing at its splendid plant at Harvey, Ill.

News Items of the Week

At a meeting of the directors of the Eastman Metallic Body Co., of Cleveland, held Jan. 21, the following new officers were elected: President, D. H. Patterson; vice president, L. C. McLouth; secretary, treasurer and general manager, H. J. Hayes; superintendent, A. D. Ray. The company manufactures both motor and horse-drawn vehicle bodies of every description.

J. S. Bunting of the Wanamaker establishment, who was one of the Americans at the Paris show, was much

impressed with the business done there. "Every machine in the show was sold," said he, "and it seemed to me that the buyers were nearly all members of royal families, the nobility, or Americans. You could not buy a machine for delivery within from 6 to 18 months and for old machines people paid prices in excess of the list of new ones."

The New England Electric Vehicle Transportation Co., which discontinued business some months ago, has disposed of about ninety cabs, broughams and delivery wagons, comprising its entire stock of vehicles, to New York people and now finds itself with $145,000 in cash and real estate assessed at over $200,000, and of course worth a great deal more. The liquidater finds himself in a position to shortly pay a second dividend to stockholders.

Postmaster Coyne, of Chicago, who has just returned from Washington, after having secured the appointment of a commission to inquire into the needs of his department, will make an attempt to secure, among other things, automobiles to carry the mail from the large office buildings. He expresses the opinion that the work of the night men will be decreased at least 20 per cent and the mail will be cleaned up with greater expedition.

The Everett Electric Mfg. Co., Indianapolis, Ind., is preparing to place a magneto, for ignition purposes, upon the market. The magnetos have been placed for trial among many of the large makers of stationary engines and the company claims that they have given satisfaction in every instance.

Manager Wilson, of the Olds plant, at Lansing, Mich., stated last week that he expected to prepare all the parts for 1,000 machines before any of them were assembled. The indications are that the plans of the Olds Company for an immense output for 1902 are to be carried out to the letter.

The factory formerly occupied by the Dunlop company, at Bellville, N. J., has been idle ever since the removal of that industry to Hartford. It is now reported that overtures for its purchase have been made by L. B. Smyser & Co., of New York, who intend to build automobiles.

H. B. Claflin & Co., one of the most famous dry goods houses in America, have been using an automobile for delivery purposes. It has covered an average of 30 miles a day at an average speed of 7 miles an hour and has given the firm satisfaction.

The police of Denver are after the automobile scorcher and recently secured, among other victims, W. B. Felker, the well known dealer, who was privileged the next day to contribute $5 to the bank account of a police magistrate.

Th Akron (O.) Gear Works, has purchased the property of the Holman Gear Co., of Valparaiso, Ind., and will make it a part of the Akron plant.

The Ideal Automobile Co., now operating at Newcastle, Ind., is adding a lot of new machinery and expects to build a new factory.

The postmaster at Butte, Mont., has been promised an automobile for mail delivery, to take the field in July.

Automobiles Gone Abroad

WASHINGTON, D. C., Jan. 25.—The figures showing the exports of automobiles and kindred lines for the week just ended from the port of New York are as follows: British Australia, motor vehicles, $136; automobile material, $189; Cuba, motor launch, $626; London, auto-vehicles, $5,973; Winclore, motor vehicles and parts, $137.

PLANS FOR THE CHICAGO SHOW

There Will Be Two Great Smokers for Club Men and Dealers—Committees Appointed—Trying to Extend the Reduced Rate Privilege

ON Monday evening there was a joint meeting of the Chicago club and manufacturers' association show committees and the manager of the exhibition. It was decided that instead of attempting anything formal in the line of a banquet two smokers will be given, at which such form of entertainment will be provided as to insure their enjoyment by all who attend. One of these will be for visiting club members and the other for visiting dealers. Exhibitors, of course, will be invited to attend both. They will be held in a hall, 75 by 175 feet in size, on the second floor of the annex to the Coliseum, which, despite its immense size, is expected to be none too large for the occasion.

The president has appointed the following committees:

Reception—K. C. Pardee, chairman; Harrison Musgrave, F. M. Brinckerhoff, Edwin F. Brown, Dr. Brumbach, W. L. Hibbard, Dr. Cottrell, Jas. E. Keith, Dr. Frank H. Davis, John R. Markel, Paul Picard, Honore Palmer, Charles B. Slade, Ralph Temple, Oscar J. Friedman, G. H. Atkin and Harry Unwin.

Entertainment—C. H. Tucker, chairman; B. F. Schlesinger, William Parsons, Dr. Milton B. Pine and F. R. Babcock.

The management is daily in receipt of inquiries about railroad rates from all parts of the west and northwest. Although the Central Passenger Association long ago granted a rate of a fare and a third for the round trip, it has not been possible to obtain a definite answer up to this time from the western association. This is a matter over which the management of the show has absolutely no control, but it has some reason to believe that the rate will eventually be granted, in which event the fact will be broadly advertised in ample time.

As indicating the large attendance of dealers and other prospective buyers which may be expected, one of the western representatives of an eastern tire house, who has just returned to Chicago after a lengthy trip, stated on Tuesday that he had met people in practically every town of reasonable size in Minnesota, Iowa, Kansas and Missouri who had assured him positively that they would be present.

The Principal Exhibitors at Detroit

The management of the Detroit show has adopted the weekly bulletin plan used by the Chicago management, which proved so completely successful in attracting dealers last year and is being used again. Every space has been taken, the principal exhibiters being as follows: Oldsmobile, Winton, White, Ford, Baker, Mobile, Metzger, Waverley, Toledo, Schneider, National, Milwaukee and Orient automobiles; Hartford, Diamond, Goodrich, Fisk and Goodyear tires; Solar and 20th Century lamps. Beside these there will be a great display of sporting goods and accessories, including Veeder odometers, Barwest coaster brakes, Cole's 3 in 1 and Lozier motors.

Newby Oval, Indianapolis, the scene of hundreds of hair-raising contests in the palmy days of cycle racing, is expected to be the scene of equally exciting events in the automobile line, commencing on Memorial day. Negotiations are now going on between the wideawake Indianapolis dealers and members of the Cincinnati club for a series of events, the Hoosier racers promising to return the compliment by taking part in events at Porkopolis.

OHIO HAS AN ARMY OF NEW BUILDERS

Who Expect, Some Day, to Manufacture and Sell Automobiles —Buckeye State Will be Well Represented at Chicago Show

CLEVELAND, O., Jan. 26.—For the last two weeks the writer has been traveling among the automobile and cycle makers of Ohio and has found so many new makers and experimenters, springing up in almost every town, that it is a puzzle to know where the business is to end and how long it will be before every district will have an automobile maker of its own. Incidentally he has had a good opportunity to learn that MOTOR AGE, in its new form, meets with general approval, that its circulation claims are accepted without question and that the new movement is regarded as of great advantage to the industry.

Ohio will be well represented at the Chicago show. I have been closely questioned as to the progress of events and have learned that not only will the dealers themselves be present but that they will bring with them a large number of prospective buyers. The people from the Dayton houses will be there in force. Mr. Appel, of the Dayton Electrical Mfg. Co., was there last year and will be there again. Mr. Bierce, of the Dayton Motor Vehicle Co., expects to make an exhibit if he can secure suitable space. He expects to show Dayton burners in operation.

A gasoline machine is to be placed upon the market by Brening Bros., of 68 East High street, Springfield. These people have a large factory, expect to be ready soon, and will furnish, in addition to complete machines, running gears, differentials, carbureters, frames, motors, radiators, mufflers and other parts. Another Springfield man has finished and is now testing a touring wagon of French design. He is Emil Koeb, of 148 East Main street, who after a run of 35 miles on the day of your correspondent's arrival, is satisfied that his machine operates perfectly. Mr. Koeb has interested capital and believes in about 4 or 5 months he will have a factory ready to produce machines ready for the market. He is determined, however, that he will not attempt anything of the sort until the merit of his machine has been proved beyond question.

Still another Springfield man, Dr. C. W. Russell, 76 East High street, has been experimenting, and has a road wagon almost completed which will weigh in the neighborhood of 1,500 pounds. His intention is at some time in the near future to organize a company and equip a factory.

Springfield generally is so full of gas engine makers that they are to be found nearly everywhere, but their product is almost entirely stationary engines.

Another and far more important concern than any of the foregoing, and one which has not only an abundance of capital but a well equipped factory, ready to run, was discovered not very far away, but begged for secrecy until such time as they are able to offer machines to the public.

The Midgely people, at Columbus, find their present capacity altogether too limited for the demand for their tubular wheels and have made arrangements to move in about 30 days to a new factory where they will have about 30,000 square feet of space. Columbus, as a whole, can hardly be called a lively automobile town. Graff Bros., of 23 West Broad street, have made a 1,500 pound machine and expect to organize a company. They are not likely to be ready to produce before the middle of the summer.

Beardsley & Hubbs, now of Shelby, will be at the show with a good exhibit. They have a nice factory, and appearances indicate that they are doing a good business. They have not, so far, made many styles, considering it advisable for the present to stick to a good road wagon weighing about 1,200 pounds. They have had orders for delivery wagons, of which they made a few, which are now in successful operation by an Akron house, but do not intend to go into this branch of the industry except on special orders. The concern deeply laments the recent death of Colonel Cockley. It is quite probable that the colonel's son, Harry, will become connected with the company. It was due to the colonel's influence that the company moved from its old quarters to Shelby.

The German-American Automobile Company

New York, Jan. 23.—Within the past few days has been organized a motor vehicle manufacturing company that, from the personality of its officials and backers and the plans outlined to a MOTOR AGE man yesterday by James Macnaughton, its general manager, seems likely to cut no small figure in the industry in the near future.

It is to be called the German-American Automobile Co. Its president is William N. Beach, of the Lawrenceville Cement Co. Thomas H. Gillespie, of the well-known contracting concern, the Thomas A. Gillespie Co., is the treasurer. Robert E. Dormer, the capitalist, is a director. John H. Schultz, formerly with the Daimler Co., at Carnstadt, Germany, is the designer. Mr. Macnaughton was a former superintendent of the Automobile Co. of America.

"Our vehicles will be out and out American make and material, though built along well established German lines," said Mr. Macnaughton, "and that is how the company gets its name. Our plans are ready and we have made arrangements for material to begin manufacturing at once. By May 1 we expect to have vehicles ready to sell. We are taking no orders for them ahead and will market them to the first buyer from our salesroom floor. We will build but one type—a high class touring carriage of foreign design."

Mr. Macnaughton showed the MOTOR AGE man a blue print. It showed a vehicle of the tonneau type and of decidedly foreign appearance. Its lines were certainly symmetrical and the drawing presented the vehicle as an altogether attractive looking machine.

"We will build with high clearance for American roads and to meet conditions existing here," continued Mr. Macnaughton. "Our vehicles will weigh 2,300 pounds. The motor is four cylinder, giving twenty-five brake horsepower and fitted with governor. The speed gearing is four forward and one reverse, and controlled entirely by one lever, placed at the driver's right hand. The carriage will have four brakes and water cooled motor. The steer is by wheel and is reversible. Ignition is by jump spark, and the body is of individual or double front seat and detachable tonneau body."

The temporary offices of the company are in the Central Building, 143 Liberty street, this city.

Steam Delivery Wagon Built in Missouri

KANSAS CITY, MO., Jan. 22.—Western enterprise has been exhibited by the Day Automobile Co., of this city, in the successful production of the first large steam delivery wagon built west of the Mississippi. It was designed by W. T. Irvin, is in daily use by the Geo. P. Peck Dry Goods Co. and is giving satisfaction. The wagon, filled, weighs 1,820 pounds and has a carrying capacity of over 1,000 pounds. The wheel base is 69 inches. The floor, under which is the water tank, holding 57 gallons, is 10 inches above the sills, and the inside measurements of the carrying compartment 3 feet 7 inches wide, 5 feet 6 inches in length and 4 feet 8 inches high, double decked by means of a removable rack.

The wagon is operated by a 10 horsepower engine, and can make 20 miles an hour. The boiler is 18 inches

in diameter, of the fire tube type, and is provided with a super-heater. Water is supplied by a cross head pump. The feed water passes through a coil in the muffler, which heats it before entering the boiler. It is also provided with a hand pump.

The burner has a simple and unique device, which effectually prevents burning back. It also prevents the fire from blowing out, and creates a forced draft when the carriage is in motion. A forced draft can also be created by a steam blower operated from the seat. The wagon has an anti-freezing device, which keeps up a circulation of steam around all water pipes, and allows the wagon to be used in the coldest weather. An auxiliary throttle is provided, in which can also be used a lock to prevent the wagon being started when unattended.

The throttle, auxiliary throttle, reverse lever, valves and steam pump for water and air, anti-freeze, blower and gasoline cut-off are all in a space of 4 inches, inside the wagon, and near the right hand of the operator, making it unnecessary to change position to operate the wagon. The water glass is placed inside the wagon and is reflected by a mirror on the dash. The brake is a double acting ratchet arrangement, worked by the foot, and is strongly made for use on steep grades.

THE DAY COMPANY'S DELIVERY WAGON.

Diversified Uses of Small Motors

Within the last 2 weeks the P. J. Dasey Co., 19 and 21 LaSalle street, Chicago, has sold air cooled motors for four widely different purposes. One was for a launch, one for bicycle, one for running a jeweler's polishing lathe and one for driving a sand paper polisher, for use in polishing the surfaces of newly laid floors. The latter machine, according to its designer, is capable of doing, in 2 hours, what it takes two men 2 days to accomplish by hand. This illustrates the usefulness of small units of power in many different paths of industry and the tendency toward mechanical power appliances accomplishing, in a short time, what it has taken manual labor a long time to complete and quite likely in a more efficient manner.

The Fouillaron Expansible Pulley

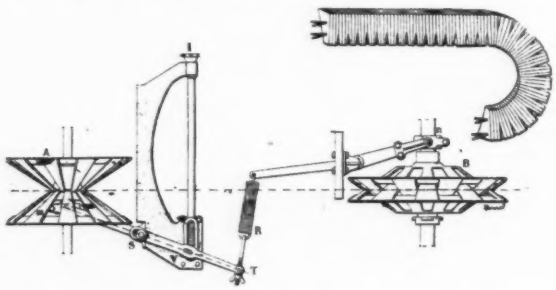
The light Fouillaron carriage, which attracted much attention at the Paris show, lacks, in its construction, the gear transmission usually found in French carriages in which gasoline motors are used. The method of transmission is illustrated by the drawing accompanying this article. It is composed of two pulleys, which allow of expansion and contraction, both operated by one lever from the seat. The construction is of interest to Americans for the reason that a similar attempt is being made in this country, a Buffalo maker having built a machine embodying the same principle, the details, however, differing.

The French carriage uses a differential gear on the countershaft, the drive to the rear wheels being accomplished by chains in the usual way. The expansible pulleys are constructed to be used in connection with a belt of special pattern, shown in the illustrations. It is so shaped as to fit the angle of the pulley at any position, from the smallest to the largest diameter, being made of sections of leather through which run twisted gut strings. The front pulley is connected directly to the motor shaft, the rear pulley being mounted on a countershaft next to the differential. The pulleys are governed as here described:

Under the steering wheel is a smaller one, which, by means of a bevel gear and chain, is connected to the lever which operated both pulleys, and which, when turned in one direction, increases the diameter of the driving pulley, at the same time reducing that of the driven in the same ratio. Thus the speed is increased. A reversal of the operation gives the lower speed, or any variation between the two. A method of tightening the belt is provided. A device, which can be operated

from the seat, increases the diameter of the driving pulley without changing that of the driven. This device is seldom used, however, owing to the inextensibility of the belt.

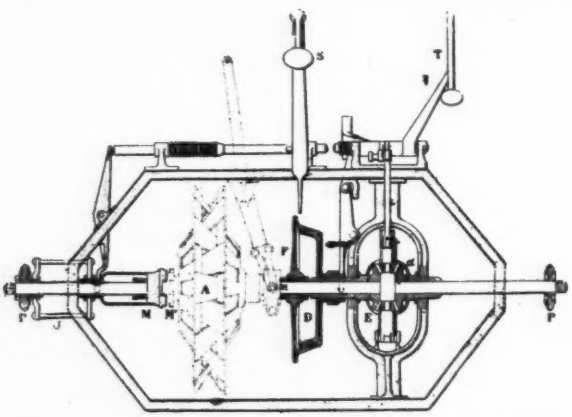
Disengagement of the motor is accomplished by means of a male and female friction clutch, mounted on the countershaft between the driven pulley and the differential. The driven pulley is attached to the cone of the



clutch, the two revolving loosely on the countershaft when the clutch is disengaged. The female portion of the clutch is attached to the sleeve, through which the differential transmits the power; consequently, when the clutch is thrown into engagement, the driven pulley practically forms an integral part of the driving mechanism and revolves at the same speed as the countershaft.

The reversing mechanism is attached to the countershaft on the left side, and is operative on the left rear wheel only. This is thrown in and out of gear by a foot lever carried to the front of the machine. This appears to be the weakest part of the construction, the vehicle being of such a heavy type that a more reliable method of obtaining the reverse action should be provided. A band brake is fitted around the differential and is operated by a foot lever.

While this method of driving has been illustrated a number of times in foreign and home papers, it has never been successful to such an extent as to warrant its being adopted as a commercial commodity. The difficulty, heretofore, has been mainly in the construction of the driving and driven pulleys, and in making a belt which would allow of effective transmission of



power under the conditions imposed. The American machines that have come under the notice of the writer have expanding and contracting pulleys made of numerous parts, which are liable to so great a strain and wear that it is doubtful whether efficient transmission could be obtained for more than a limited distance.

In the French carriage it will be noted that the pulleys are substantially built, and are devoid of joints or working parts in the wheels that are liable to more wear and tear than that due to the slipping of the belt and the friction caused by it in passing on and from the wheels. The increased or decreased diameters are obtained by the two half sections, of which each of the wheels is composed, being movable through each other, and joints or other working parts are absent. The accompanying illustrations may be of some value to American makers of what would be an ideal form of transmission if successfully worked out.

New Incorporations and Enterprises

At Witchita, Kan., the Walterschied Automobile Co. has been formed to build steam vehicles. C. H. and W. Walterschied are pump manufacturers, and with their foreman, Alexander Glass, form the new company. Unlike many other builders, they are not attempting to make anything revolutionary, having obtained most of their ideas from the machines at present in use. They simply state their belief that the automobile has come to stay, that they can build as cheaply as anyone else, and that they want to get a share of the profits. Another reason given is the difficulty of obtaining repairs for some of the machines made in the east. A branch house has been established at Winfield, Kan.

With $1,000 paid in to start with and a capital of $3,000,000 as its objective point, the International Wheel, Tire and Rubber Mfg. Co. has been incorporated in New Jersey by William T. Ellis, of Springfield, Mass.; H. B. Scofield, of Denver, Colo.; F. D. Palmer, of Poughkeepsie, N. Y., and H. L. Prentice and William Sandford, of New York, each holding $200 worth of the stock. Rubber carriage tires, bicycle wheels and tires and all kinds of vehicles are expected to be made by the new concern.

There has been organized, at Phœnix, N. Y., the Industrial Machine Co., to manufacture and sell automobiles, motor cycles, coaster brakes and hardware specialties. The capital stock is $25,000, of which $7,900 has been paid. The directors for the first year are William G. Habere, Palmer G. Hermance, Edward Oswald, August Finck, Jr., and George Finck, of Syracuse, and G. Erwin De Long and J. I. Van Doeren, of Phœnix.

The Indianapolis Transfer Co., organized to operate electric cabs and delivery wagons, commenced work last week under somewhat discouraging conditions as regards weather but with great success from the standpoint of patronage. The cabs were supplied by the Woods Co., and will stand, when not in use, at the Union station and at all the regular cab stands. The charge is $1.50 per hour. John E. Morane is the president of the company.

Mr. Hensen, the owner of a bus line at Blackwell, O. T., announces that he will buy an automobile to carry a dozen passengers and run it between that famous city and Newkirk. He believes that the absence of reasonable railroad facilities will insure the success of his venture.

It is reported on good authority that gentlemen connected with the Detroit Stove Works are interested in a concern which will shortly commence the manufacture of automobiles. The company itself, however, is not connected with the enterprise.

Five automobile stables are to be built on East Seventy-fifth street, New York, as a speculation. The first floor will be used for the storage, the second for a club room for the owners and the third for living apartments for the chaffeurs.

The German American Automobile Co., of New York city, to which reference is made elsewhere, has been duly incorporated with capital stock of $100,000, the directors being F. H. Gillespie, U. C. Brewer and J. L. Schultz.

PRACTICAL JUMP SPARK IGNITION

An Article Designed to Show That It Has Been and Can Be Applied to Large Stationary and Marine Engines—Details of a Severe Test

BY PERCY J. DASEY

THERE seems to be a prevailing idea that jump spark ignition is not efficient for large stationary and marine internal combustion engines. To eliminate that idea I give you a few facts in connection with a trial I recently made in an eastern city, where I had been called by a manufacturer of engines ranging from 15 to 1,000 horsepower. I had been in correspondence with the company for some time, and in all the letters received a trace of skepticism was perceptible, it being the belief of the chief engineer and designer that the jump spark was a mere toy in comparison with the form of make-and-break then employed.

I visited the factory with an equipment which was the same, in all details, as those my company sells to the automobile trade, even the plugs being but ½-inch pipe thread, of my own make. A small battery, dry, of six cells was employed at first to make the trial, and afterwards the coil was attached direct to the circuit used in the plant, being 10 volts, 20 amperes.

The first thing I had to do was to make a hollow plug to fit the holes in the large plugs (in which the contact spark plugs were made to fit) with which the engine was provided, one at the end of each valve chamber. This was accomplished after some close figuring, and the small plugs screwed in place, the wires having to lie about four inches in this hollow plug and being subjected to terrific heat when the engine was running. This made the matter of good insulation a difficult one, so a roll of asbestos was placed around the wires in order that the insulation could not burn off. The primary make-and-break apparatus I had constructed myself, on the vibrator principle. I attached it to one end of a shaft which carried the inlet valve, this being of the rotary type, making one revolution to every two of the crank shaft.

With the parts in place on one of the largest engines, which I was afterwards informed had never run successfully in connection with the work required, I began the trial. With 140 pounds air pressure operating in one cylinder—the engine being of the double cylinder tandem variety—it was carried over the first compression and started from that point without difficulty, but owing to the high compression and temperature, the packing in the plugs began to leak and the engine had to be stopped until that could be remedied. The same thing occurred three times in successsion, until the packing was so arranged that no leakage occurred. After that no further trouble was experienced at that point.

In the first trial after that the engine was started without a load and the switch governing a certain circuit around the plant thrown in, this placing a half capacity load on the engine. Another switch was thrown in which doubled the first load and brought it up to the rated capacity of the engine. At this point it could be seen that the engine was working regularly and not missing an explosion. It had missed none on the lighter load, either. Then a double load was thrown on, the engine seeming to groan under the work, but the ignition did not fail once. I was fearful that under the enormous heat and strain the porcelain insulators or packing would give way, but that did not occur. After a time the belt was thrown off in order to note the effect on the engine when running light.

At this point it may be well to state that the object of the test was to determine the reliability of the jump spark method of ignition on this type of engine when the same was used for generating electrical energy for street railway purposes or for other work where the load varied. The engine was provided with a governor, very sensitive in its action, and which, even when running at normal speed, cut off the intake of gas at half stroke; as the load was lightened the speed gradually increased, of course, and the governor was brought into action still earlier in the suction stroke, thus cutting off the intake of gas earlier as the speed increased. The increase in speed necessary to shut off the gas at the earliest point of the stroke was hardly noticeable owing to the sensitiveness of the governor, that occurring after the piston had traveled about 4 inches on the out stroke. It will thus be understood that the charge of combustible material in the cylinder was exceedingly small, but to maintain a constant speed under the varying conditions under which the engine was forced to operate the charge must of necessity be exploded, or the decrease in power would be too noticeable and the effect on the generation of current by the generator unsatisfactory.

In the primary form of ignition an immense spark was provided, yet it lacked the heat to successfully start combustion of the light charge when the engine was running under light load or with no load at all, and this was the reason for the trial of the jump spark, it being the desire of the manufacturers to provide a method of ignition, if such could be found, which would allow the engine to perform its work by being enabled to give a power stroke each time, regardless of the load under which it was operating. This I accomplished to the satisfaction of the company, although my plugs were considered too small for every day use in connection with these large engines.

As the temperature in the cylinders, when the engine was taking a full charge of gas, exceeded 2,000 degrees, according to the designer (I do not stand responsible for this statement), and the pressure during combustion was 500 pounds or more, and the plugs affixed in such a position as to be covered at all times with valve and cylinder oils, I think the test made was successful beyond question. As it satisfied the manufacturer as to the reliability of the method, and that, too, after he had expressed himself as being a disbeliever, I think the idea that this method of ignition is suitable for small engines only is not well founded. The prevalence of such ideas, however, is accounted for by the fact that the jump spark method has been in vogue but a comparatively short time in this country and is little known in comparison with the hot tube and primary methods.

In my tests I used Dow coils and my own plugs. I think the results speak well for the efficiency of both.

I might add that I have equipped engines ranging from 1 horsepower up, and which have ranged in speed from 175 revolutions per minute to 2,000, and have yet to report a case of failure where the engines have been correctly made. There are some engines, however, that cannot be successfully ignited owing to their faulty construction, and if manufacturers would only take enough interest in the jump spark method to enlighten themselves on the subject and learn at what point it can be most successfully applied there would be less trouble and more satisfaction to all concerned. I wish to state that an editorial in a recent issue of the Horseless Age regarding the efficiency of the jump spark method of ignition does not set forth the facts, either owing to a limited knowledge of the subject or because of a preference for the older methods still used on some makes of engines.

SMALL MACHINES AT SMALL PRICES

Philadelphia Maker Produces Vehicles Which He Expects will Please Desciples of Popular Figures—Has the Appearance, However of a Promotion Enterprise

THE promotion of a company to manufacture vehicles at extraordinary low prices seems to be the object of the formation of Turner Automobile, Limited, with temporary offices at 304 North Broad street, Philadelphia. The printed matter of the company states that its object is to make machines in large numbers and supply parts to the trade. It will operate under patents issued to George T. Turner, on July 24 and 31 last. Over a year ago Mr. Turner made a little three-wheeled machine which he called, and will continue to call, the Gadabout. It ran about the streets of Philadelphia, made the run to Atlantic City and back, making each journey inside of 3 hours, and attracted the attention of the daily papers. It is reported to have run 4,000 miles without serious injury.

There is one feature of the printed matter recently sent us, however, on which the trade will not look with favor. "We propose to practically give away fifty of these machines," it says, "placing them at as near cost as possible, such price not to exceed $400 each, and for the purpose of securing agents in all sections of the country and particularly desiring the vehicles to be generally seen in practical operation, we make the following offer: To anyone purchasing or selling one of these fifty vehicles at the above net cash price, we will assign and transfer to such party as commission, shares of stock of the Turner Automobile, Limited, representing a par value of $200."

In the first set of circulars the price was given as $300, but that has since been increased.

The reader will probably be interested in the specifications of the Turner vehicles, which are as follows:

Liliputian, three wheels: Motor, 1¼ horsepower, air cooled; frame, truss, seamless tubing; wheels, 26 inches, steel rims; tires, 1⅝ inches, pneumatic; tank, 2 gallons; speed, 6 to 12 miles; wheel base, 4 feet 3 inches; width, 36 inches; width of seat, 26 inches; height of floor, 12 inches; height of seat, 31 inches, weight, 150 pounds; combination driving hub; one speed forward and reverse; emergency brake; price, $225.

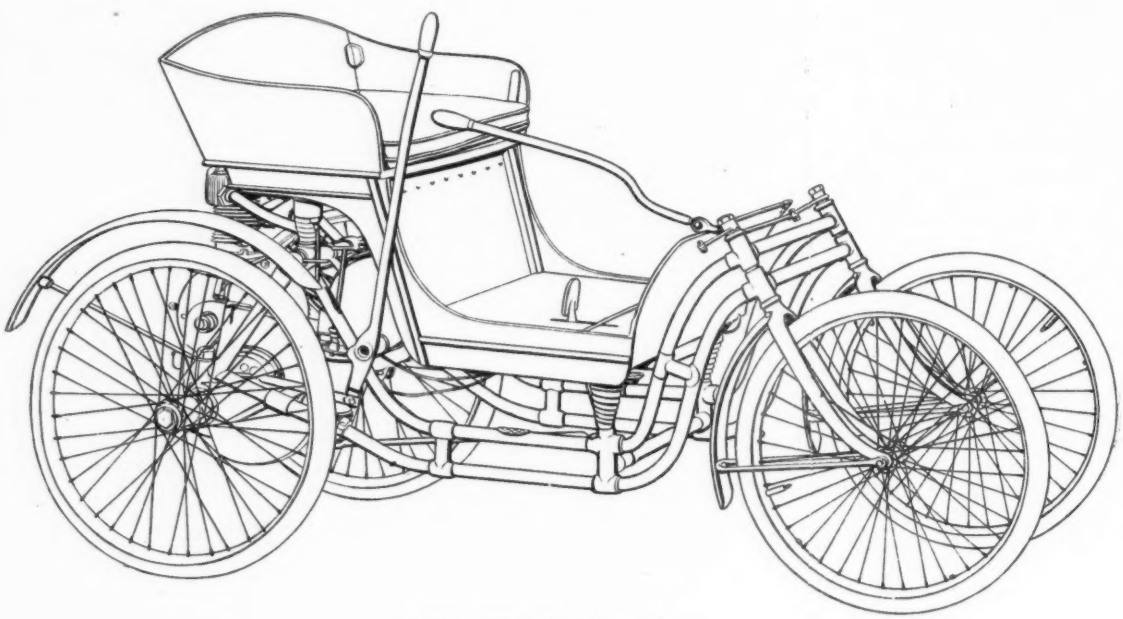
Gadabout, three wheels: Motor, 3 horsepower, air cooled; frame, truss, 16 and 12 gage tubing; rims, 28 inches, steel; body, panel or spindle; tires, 2 inches, pneumatic; finish, black or special; speed, 6 to 15 miles; weight, 400 pounds; width, 3 feet 4 inches; length, 7 feet 6 inches; height of floor, 20 inches; price, $400.

Runabout, four wheels: Same as Gadabout except the additional wheel and a change of sizes of wheels to 28 inches rear and 26 inches front; price, $425.

Magneto Ignition for Small Engines

In a recent issue of the Motor Car World a short article appeared devoted to the use of magnetos or igniting dynamos on small engines suitable for motor cycles, the article in question having been written in answer to a query. The same question has been asked in the office of this paper and answered practically in the same language. That the same ideas should be advanced at about the same time seems to indicate that the trend of thought is to a limited extent toward the production of an electrical igniter that will eliminate the necessity for battery and, possibly the coil. While the question has been asked by but few people it is known that at least three concerns in this country are working on dynamos to accomplish successful ignition without the use of a coil or battery. How far the matter of experiment has been carried on it cannot at present be said, but it is authoritatively stated that results of an encouraging nature have been attained, such as would warrant the continuation of work along this line. The question above mentioned follows:

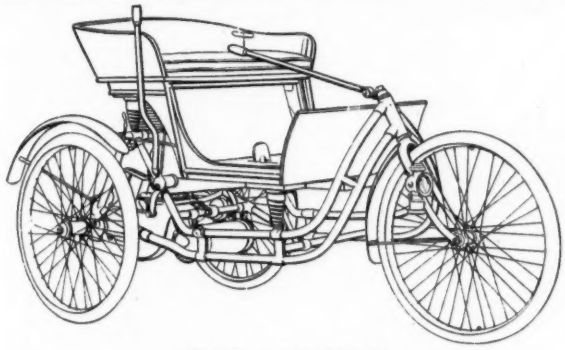
"What is the cheapest form of magneto ignition you know of? I think this is far superior to using either batteries or accumulators, but it is very expensive to buy even with a coil. I think a small dynamo could be arranged to give the necessary current for it, as it does not need a very large one to give 4 volts. For instance,



THE TURNER RUNABOUT

an arrangement like a magneto shocking coil might do, substituting the shocking coil for a spark coil. Has this ever been tried?"

The question is rather vague, and the querist evidently does not fully understand the exact requirements in magneto-ignition apparatus. He evidently wishes to cut out batteries, accumulators, and coils, and substitute a



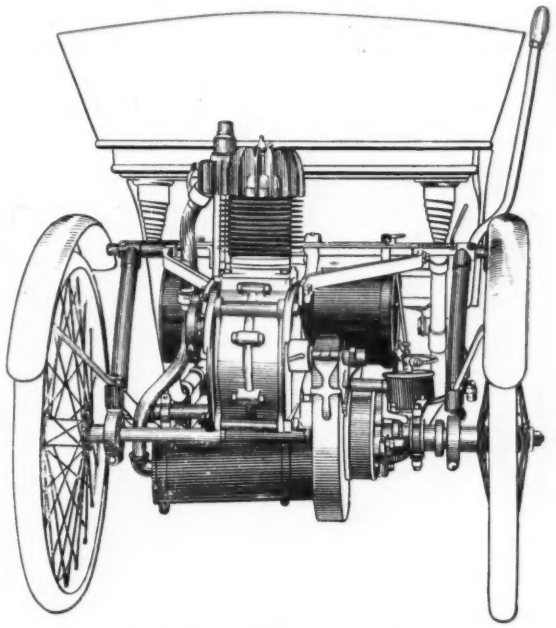
The Turner Gadabout

small dynamo for direct sparking, but in stating that a dynamo to give 4 volts need not be a very large one, he should know that for direct sparking a much higher voltage is needed, and he is evidently confusing the voltage required to give a direct spark with the voltage required to work an induction coil, which is all that the 4-volt dynamo would do. There is no complete magneto-ignition apparatus on the market at a low price, and none that is suitable for bicycle work, as the ignition spark for a ¾-horsepower bicycle motor demands a magneto just as powerful and as heavy as a 7 or 10 horsepower carriage. A dynamo or magneto to give 4 volts may be purchased from electrical dealers for little money, but such a dynamo would not give a direct spark, and would necessitate the use of an induction coil. Even then there are other reasons why a direct-current dynamo is not suitable for feeding the coil, as the effect of the rapid make-and-break would be to burn up the armature coil, and an alternate current dynamo used in conjunction with an induction coil would not work because one impulse would counteract the other. A further difficulty in adapting magneto ignition to a small motor would be the fitting of the special make-and-break mechanism in the combustion chamber to replace the spark plug. The only practical adaptation of a dynamo to a motor bicycle would be to fit a small shunt-wound dynamo for charging the accumulators, the dynamo always running when the machine was running, and a switch being provided to prevent overcharging. This method, of course, does not simplify matters at all, as both accumulators and induction coil would still be required, but it would render the machine complete in itself and get over the recharging trouble. To charge a two-cell accumulator, such a dynamo would need to give 2 amperes at 5 volts, and the cells should never be allowed to run down lower than 3¾ volts for the two, or, say, 1.8 per cell.

Success of Amateur Builders

A Chicago supply house has, during the season just closed, provided gasoline equipments for a number of machines, each of which has been used for purposes entirely foreign to the others. One was a light 4-horsepower runabout, designed and used for visiting county fairs, the owners after completing the machine touring through Illinois and Iowa, visiting fairs where races were run and entering the machine in handicaps or exhibitions against the favorite horses of the town. Out of 19 fairs visited only one race was lost, and that more through carelessness than anything else, the operator neglecting to note the condition of the battery used for ignition purposes. Sufficient money was cleared to enable another machine to be purchased for next year.

Another instance was that of an old manufacturer of electrical supplies who had devoted 30 years to his business and had come to the conclusion that he and his wife were entitled to a little recreation. He purchased the parts for a dos-a-dos and after having a removable case provided for the rear seat in which to carry a line of samples, started on a tour of the west, with no particular place in view, but making it a point to get business whenever he could, provided it did not detract from the pleasure he and his wife started out to seek. At last reports the pair were in southern Illinois enjoying life and having no more trouble with the machine than might be expected of a new hand at the business. A third was sold to a traveling salesman for a button house who started for the west by road, intending to call at every town and hamlet on the way to the coast. He has not been heard from, so it is taken for granted that he has been successful up to date. One other was supplied for hauling lumber in Kansas, and as the owner is now erecting a shop in which to build his own machines he evidently found that the self propelled vehicle was of sufficient value for that purpose to warrant the investment of capital in order that the new method of transportation might be put into prac-



Rear View of Turner Carriage

tical use throughout that section of the country and wherever else it was found desirable. Watch Kansas for results in this line.

"From the mountains of New Hampshire," says the Boston Transcript, "comes a David Harum-like story of the advent of the first automobile there last summer. An accident happened near a hayfield, where a farmer was endeavoring to repair a broken mowing machine. The farmer left his occupation and came out to inspect the remarkable object with astonishment. After a few moments of silent scrutiny he said: 'Wha' d' ye call that 'ere machine?' 'That is an automobile,' was the reply; 'what do you call yours?' 'Wal,' was the response, 'it auto-mo'-hay, but it don't!'"

VIEWS OF CORRESPONDENTS

ST. PAUL, MINN., Jan. 25.—Editor MOTOR AGE: I send you a sketch which might be presented to call the attention of the makers to the need of an improvement. It represents a part of a set of side steering fittings. The lever itself is not in need of additional strength, but the bent and threaded piece of steel marked X receives and transmits all power and strains applied either to the steering lever or caused by uneven surfaces and should be increased in diameter to at least twice its present size. I have seen breakages at this point more than once, but supposed that some accident was responsible for the trouble; but the last one was brought so forcibly to my notice that it cannot well be passed without comment.

A woman physician of Chicago had a steam carriage constructed and fitted it with side steering in which parts, such as illustrated, were used. On the first trial of the vehicle the threaded piece of steel broke at the bend, having been partially broken in bending, the result being a terrible smash-up. The occupants of the vehicle were seriously injured, while the vehicle was damaged to the extent of a new running gear, front wheel and tire. As the accident happened within 15 minutes after it had been taken out of the shop, and had been run on asphalt only, it had not been subjected to usage that could have produced such disastrous results in so short a time.

The gear used was that of an eastern concern, but it is a common practice to use the same construction. The part should not only be larger but of better material.—Yours, etc., A. REPAIRMAN.

Popular Construction Which May Have Been Patented

CHICAGO, Jan. 27.—Editor MOTOR AGE: There is a growing tendency among assemblers of machines in which the rear axle is to carry the differential to adopt construction providing a solid shaft, running the entire length of the axle, instead of making it of two pieces joined at the differential bevel wheels. In the form now becoming popular, but which is by no means new, the solid shaft carries one of the large bevel gears forming the differential, while the other is carried on the end of a hollow shaft that fits over the solid shaft and carries one of the rear wheels rigidly attached to the outer end. The construction is thus made stronger than is usual with the old method.

It has come to the knowledge of the writer that a Chicago man claims a patent of this form of mounting the differential and will soon make an effort to call the trade to account. His claims, according to his statements, are on the construction of an axle of that character in combination with a differential composed of a number of bevel gears, so that if his patent is drawn as many others which are supposed to cover vital points have been the use of spur gear differentials may obviate conflict with his claims. It has not come to my notice that such a patent has been issued, but if such is to be I think it should be given prominence in your columns owing to the importance of the point in question. —Yours, etc., ASSEMBLER.

Troubled About Excessive Vibration

BUFFALO, N. Y., Jan. 24.—Editor MOTOR AGE: If not too much trouble I would greatly appreciate a little information on the following: I have an engine which I intend using on an automobile. It is 4½ by 5½; weight complete, 250 pounds; weight of piston and pin, 10 pounds; fly wheel, 18 inches diameter, weight 65 pounds. The engine vibrates so that I can hardly think of using it in an automobile. I tried to balance the fly wheel, but it causes the front end of the engine to vibrate at right angles to the bore of the cylinder. I thank you in advance for any information you may give on the subject. Is not the heavy weight of engine an advantage so far as vibration is concerned? Is the piston too heavy for size of engine (10 pounds); also is it better to balance on the crank than on the fly wheel?—Yours, etc., W. C. SUMMERS.

It is not possible to eliminate vibration in a single cylinder motor, but it may be reduced to a minimum by correct balancing of the parts, preferably by counterweights attached to the crank shaft. The balancing in the fly wheels of motors of that type is not desirable. The weights being further removed from the center of the crank shaft make it more difficult to get the right distribution of same than if attached to the crank shaft, where the distance from the center of the shaft to the position of the weights is less and can be more easily figured. The fact that the weights are attached to the fly wheel is accountable for the vibration of the motor cylinder in a direction at right angles to the bore, the motion being up and down. That effect is caused by the weights being too far removed from the center and being heavier than is necessary in that position; the effort of the power generated in the cylinder to move the weight naturally forcing the crank end of the motor upward and the cylinder end downward owing to the leverage applied on the crank, this acting, through the shaft, on the journals as fulcrums. The foundation of the motor being moveable or springy—suspended—allows this motion to continue as long as the engine runs and the movement is exaggerated as the speed of the motor increases. The weight (250 pounds) should be an advantage from the standpoint of steady running. The piston is not too light.

Suitable Motors for Light Vehicles

PARKSTON, S. D., Jan. 24.—Editor MOTOR AGE: I am building a few automobiles, both one and two-seated rigs, weighing from 725 to 1,200 pounds. Will you kindly inform me who makes motors suitable for this purpose? I want water cooled motors; no air cooled in mine.—F. L. WOOD.

There are a number of reliable motors ranging from about 4 horsepower, the size which could be used in the machines, up to 7 and 12 horsepower, either of these sizes being suitable for the heavier class. The Buffalo Gasoline Motor Co., Buffalo, N. Y., and Winans Automatic Engine Works, New York, both make them, and jobbers who handle them are Dyke, of St. Louis, and Dasey, of Chicago.

Wants Material for a Special Frame

PITTSBURG, PA., Jan. 25.—Editor MOTOR AGE: Can you put me in correspondence with any one who manufactures a running gear (reachless) with a bevel gear drive on the differential? I am about to build a gasoline auto on plans of my own and want to get an angle iron framed running gear to place my engine in the forward part of the machine.—DAVID SPEER, box 1314.

There is no concern in America building such a type of gear so far as we know. A. L. Dyke, Linmar building, St. Louis, Mo., or P. J. Dasey Co., 19 LaSalle street, Chicago, can supply the iron frame, but it is not likely with the bevel geared differential except on special order. Charles E. Miller, of New York, might assist, but it is doubtful, owing to this type of gear being used only in specially made machines.

Who Makes These Sprockets?

HARRISONVILLE, MO., Jan. 25.—Editor MOTOR AGE: I am looking for a firm which makes sprockets to be fastened to spokes of ordinary Sarven wheels, for use on a vehicle with "dead rear axle." Should you know of any, please refer me to them and oblige.—Yours, etc., J. B. DOUGLAS.

TOOL STEEL BALLS

We make over 500,000 balls every day. Our plant is operated day and night to keep up with orders. All the large automobile makers buy from us. Our regular stock consists of balls in sizes from 1-16 to 4 in. in diameter.

THE AUTOMOBILE AND CYCLE PARTS CO.
CLEVELAND BALL AND PEDAL FACTORY
CLEVELAND, OHIO.

New Kelly Generator ...

For Steam Vehicles
Improved—Perfect in Every Way

Drip cup unnecessary in starting—Aluminum case over generator—All connections on the outside—Strongly made—Easily adjusted—No flaring or flashing in lighting, even in strong wind. A quick and powerful generaton—Main fire valve controlled at seat—Small and neat in appearance and adapted for any machine.

Our new One-Piece Cast Burners have been greatly improved both in power and strength. No wedged tubes in its construction. All in one piece and easily cleaned.

Address, KELLY HANDLE BAR CO., Cleveland, O., U. S. A.

Reduced Railroad Rates ...To The Chicago Show...

Residents of the territory embraced by the WESTERN PASSENGER ASSOCIATION are advised that the management of the show is making efforts to secure the same concessions as have been granted by the CENTRAL PASSENGER ASSOCIATION and hopes to be able to announce that the rate has been granted, in ample time for all to take advantage of it. :: Meanwhile the

Central Passenger Association

has granted a rate of

ONE FARE AND A THIRD

for the round trip, on the certificate plan, for details of which write the management or watch the automobile papers.

The list of exhibitors now includes practically every maker of prominence in the United States.

MAKE A NOTE OF THE DATES,---MARCH 1 TO 8.

SAMUEL A. MILES, Manager, Monon Building, Chicago.

Important Considerations in Construction

MANY points of value in the construction of motor vehicles are overlooked, either on account of a desire to save money or through lack of knowledge regarding the actual requirements of a vehicle of the type to be produced. Nothing leads to or is responsible for greater dissatisfaction to the owner of an automobile than the knowledge that it is not sufficiently powerful, not strong enough to withstand the usage given it, has been slighted so far as automatic labor-saving devices are concerned, that the mechanism is inconveniently placed, or that little things that might have been given attention had been forgotten, left out to save a little expense, or because the maker did not think it necessary to put them in.

These remarks apply to the manufacture of commercial machines as well as to the builder of individual automobiles who puts one up for his own use. By big manufacturers advice is seldom accepted with favor because their experience is sufficient to warrant their building their product as they see fit; yet to the individual who contemplates making an automobile, and to those who have already started to do so, some of the ideas advanced may be beneficial. Then, too, the owner of an automobile may find some encouragement in reading these lines and may find points in which he can improve his vehicle in details that have heretofore been neglected.

In steam vehicles it is common practice, or rather has been, to build the machines in the most simple manner; that is, to set up a boiler, engine, frame, body, etc., and connect them with much the same equipment used for stationary engines, omitting the use of many devices which add to the efficiency and practical value of the automobile. Such devices may be known to many users and may not; but whether or no, the knowledge that they exist may be of service in adding to vehicles already built up or completing machines now under construction, thereby providing them with a higher practical value.

Before mentioning automatic devices it might be well to state that ¼-inch fittings and pipe connections are preferable to ⅛-inch commonly used, inasmuch as a machine thus equipped is freer from defects caused by clogging, small capacity for passage of steam or water; that they necessitate fewer connections when assembling, and allow of more accurate registration in the water glass and column. Often, in assembling, the water glass, water column and perhaps a regulator are attached to the same lead from the boiler. If the pipe is ⅛ inch, it stands to reason that the capacity is too limited for the accurate operation of all three. For instance, when the water is low in the boiler and the top cock on the column is opened, it takes but an instant before water is emitted; this, owing to the incapacity of the small pipes, which do not allow free passage of steam during its escapement, without suction, which tends to draw the water from its low level up to the point of outlet. This ofttimes is responsible for burned boilers because the driver is led into a mistake regarding the water level, for the water glass, owing to its small connections, sometimes becomes clogged and does not register correctly, consequently there is no way for the operator to know the amount of water being carried. The sediment found in most boilers of the tubular type is responsible in many cases for the water glass failing to operate. This can be avoided almost entirely by using the larger size connections.

Do not be afraid of using the proper equipment because you can save a few cents on each connection by using the smaller. It pays in the long run, and the short one, too, for that matter. It is sometimes better to use even half and three-quarter pipe when the water glass, water column and low water alarm or water regulator are to be attached to one set of pipes leading from the boiler.

So far as automatic devices are concerned, the first to be given attention is the automatic gasoline regulator for governing the supply of fuel to the burner. There are three or four kinds now on the market, two makes being sufficiently well known to warrant recommendation. One is the Kelly and the other the Dayton, both of which operate in the same manner but which differ in detail. These regulators are attached to the burners at one end and at the other to a live steam pipe leading direct from the boiler. The steam pressure, when it reaches a certain point, operates a diaphragm, which in turn moves a needle valve a sufficient distance to shut off the supply of oil sufficiently to reduce the size of the flame at the burner and thereby allow the boiler pressure to remain at the desired point until, by use, the pressure has been reduced. The regulator may be set at any desired point and will operate on a variation of from 5 to 10 pounds of steam pressure. For instance, if it is desired that not more than 175 pounds of steam be carried at any time, the regulator is set so that it will shut off the gasoline at that point, and after the pressure has fallen, say, 5 or 10 pounds, the diaphragm again opens the needle valve and allows a full flow of fuel to the burner.

Regulators of this class are used to advantage in connection with generators and pilot lights, these being provided as a more simple and rational method of generating gas and maintaining it than the older method of using a torch to light up, as is still in vogue in some carriages. These generators are attached to the base of the boiler shell at the point where the burner receives the gas and are composed of a small burner much on the same order as a gasoline stove, which, after becoming heated, provides the gas for the main burner. At the same time, when the main burner is shut off, the generator which is provided with a small burner, termed a pilot light, allows a small jet to burn, which not only keeps the main burner hot but provides a light by means which of the main burner can be lighted as soon as the gas is turned on. There is a valve provided for the regulation of both pilot light and main burner, thus making the handling of the fire an easy matter in comparison with what it was in the older form of construction.

One may leave a steam carriage thus equipped with the main burner turned off and the pilot light only burning and upon returning have only to turn on the main burner valve to have a full flame, and thus reduce the time for generating steam to a minimum. No carriage is complete without some arrangement for obtaining similar results.

(Continued Next Week)

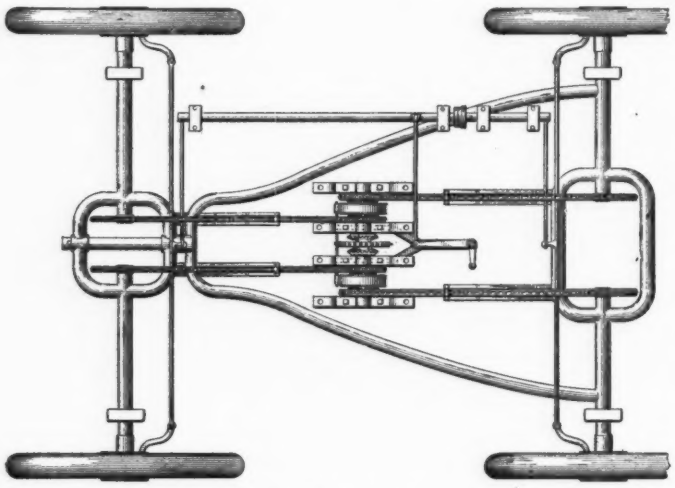
Applies Power to All Wheels

The Cotta Automobile Co., of Lanark, Ill., has finished and tested a steam carriage which is thus described by Charles Cotta, its designer and builder:

"An automobile, in order to be a successful traction vehicle, must not only be able to travel on dry roads, but must be able to travel and propel itself successfully in all seasons and under all conditions of roadway. It must have ability to ascend and descend slippery grades whether on ice, snow or mud. It must have ability to raise itself out of mudholes and ruts and mount obstacles and be guided over rough and uneven surfaces without danger of jerking the steering lever out of the operator's hand.

"The difficulties of operating automobiles as above have come under our observation so vividly that we have designed, patented and built a vehicle which overcomes them all. We use steam as motive power, and divide the power, at the driving shaft, by our compensating gear, into four equal and independent parts and

transmit it to each of the four wheels in such manner as to allow each wheel to travel at whatever speed is required, whether turning curves or traveling over obstacles or uneven roadway, and at all times and conditions each wheel does exactly its own one-quarter of the driving.



"The steering pivot is placed in the direct center of the hub and in turning curves all four wheels oscillate so that the rear wheels travel in the same track as the front ones, making but two tracks in the mud whether traveling straight ahead or turning curves.

"As all classes of automobiles are at times required to travel over conditions where the ordinary two wheel drive has insufficient traction,our four wheel drive and four wheel guide is equally desirable for business as well as for pleasure vehicles. With our four wheel transmission and guide we do away entirely with slipping of wheels, cutting of tires, skidding, vibration of steering device and have no difficulty in operating our vehicle over ice, snow, mud or sand.

"The accompanying illustrations give an idea of the manner of transmission. The boiler is placed in front of the operator, the engine under the footboard and the compensating gear under the body. The axles are tubular with a shaft running through them transmitting the power from the sprocket wheel to a universal joint in the hub."

Relief from Side Slip

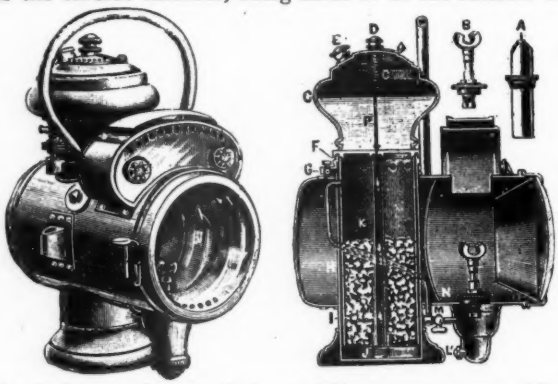
The causes of side-slip and its prevention is a subject discussed intelligently and entertainingly by a correspondent who says that "except in rare cases, motor vehicles possess these characteristics: 1, the power is transmitted to the rear wheels; 2, they have differential gears. The result of the first is that the machine is pushed from the rear. Provided the direction of the car is in a straight line, all is well, but directly the course is altered the back tends to swing round to the front, and if at the same moment the adhesion of the driving wheels is materially lessened by the presence of mud, etc., the back of the car actually does come to the front—that is, there is side-slip. As to the differential, side-slip may result in two ways. Owing to bad workmanship or imperfect lubrication, one wheel may turn more easily than another, and this on a greasy road is a certain cause. Then, again, if the road is greasy, but, at the same time, is not uniformly so, one wheel may have more adhesion than the other, and then side-slip will result, even when proceeding in a straight line. In addition to these there are two other fruitful causes of side-slip—the pneumatic tire and the brakes. The pneumatic tire has a larger area in contact with the ground—that is, the pressure per unit of sectional arc is less than is the case with solid rubber or iron tires. From this results decreased adhesion, and consequently side-slip, the latter increasing with the size of the tire. As regards the brakes, it is possible for these to act unequally on the two driving wheels, causing side-slip in a similar manner to the differential.

The complete prevention of side-slip is, of course, impossible. Even though the conditions were reversed the same difficulties would apply in the event that the carriage were stopped, or even if its brakes were applied on a slippery road, from the fact that the momentum would tend to produce slippage corresponding with the inclination of the surface of the road. The following suggestions are offered, however, as likely to tend toward improvement:

First, pay great attention to the differential, and see that it turns freely in both directions, and make sure that the brakes act squarely on both wheels. When, from the nature of the road, side-slip is anticipated, avoid putting too much weight at the back of the carriage, and always apply the brakes as gently as possible, gradually increasing the pressure.

A French Acetylene Lamp

The illustration is of a French lamp, designed on lines that are becoming popular in this country. It is composed of the three principal parts, the body, water tank and carbide chamber. The tank is removable, as is the carbide chamber, being made to fit the exterior of



the body snugly, so that no jolting can occur. The water tank is fastened to the body by a number of screws, attached to the base, and which connect to the body by threaded lugs. The needle valve in the tank is centrally located and opens or closes a small opening in the base, the water, when allowed to drop, being carried to the base of the carbide chamber by means of a tube running from the valve to the bottom of the tubular shaped body, thus allowing the water to enter the carbide chamber from the base and work its way upward. The gas is carried from the top of the carbide chamber to the burner by means of a pipe which leads to the chamber below the burner. It passes around the carbide chamber on the inside of the outer casing. In the chamber which the gas enters before passing to the burner means are provided for freeing it from small particles of dirt that might have entered the pipe and, without the check, would be carried to the burner. This does away with the possibility of clogging, a defect found in many of the old types of lamps. The lamp in other respects follows the popular French design.

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Satisfaction Guaranteed.

An Endless Chain of Satisfaction Is Created by the Sale of Trustworthy :: :: ::

SOLAR LAMPS

The Chauffeur Is Satisfied,
The Dealer Is Satisfied,
The Jobber Is Satisfied,
We Are Satisfied,

and the Whole Secret of Satisfaction is Due to Our Patented System of Gas Generation Which Cannot Be Used by Others

Your Line Will Not be Complete Without the

SOLAR AUTO-HORN.

PRICES AND ELECTROS UPON APPLICATION.

THE BADGER BRASS MFG. CO.,
KENOSHA, WIS.

THE.....

Throttle AND Reverse Lever

USED IN

"Toledo"

STEAM CARRIAGES

may be distinguished from all other throttles because it allows both a forward and reverse movement of the engine with but one lever. The gain thus made in the manageability of the carriage adds greatly to the pleasure of automobiling and will be appreciated by those who have had experience with the two-lever fashion of controlling power.

The thousand and one times, in ordinary riding, when it becomes imperative to instantly reverse your carriage, are too well known to those who have had experience with self-propelled carriages to need any re-telling at our hands. The small boy, disagreeable truck driver, and still more so motorman, all help to make imperative the necessity for a reverse lever.

The engine chain and axles are so stoutly designed that the instantaneous reversing of the engine when at full speed does not disturb the mechanism.

The Toledo Throttle is without question superior to any device yet produced for controlling steam Automobiles.

PRICES

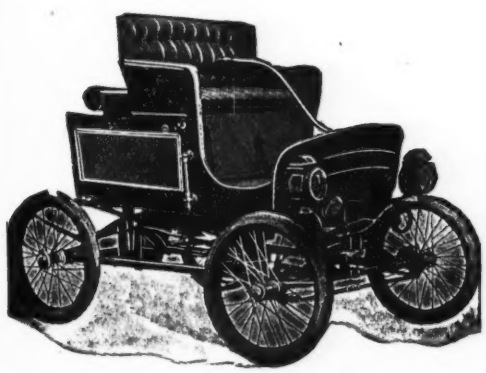
Model A - - - - - - -	$ 900.00
Model B (Model A with Top) -	1,000.00
Model C (Surrey) - - - -	1,600.00
Toledo, Jr. - - - - - -	800.00

INTERNATIONAL MOTOR CAR COMPANY

Automobile Department

Toledo Factory - TOLEDO, OHIO.

New York Branch, 91 Fifth Avenue



1902
Kelly Adjustable

Handle Bars

STANDARD BARS OF THE WORLD

No. 3 Arms, Regular Stem.

No. 5 Side Arms,
1 in. Forward Extension.

No. 4 Racing Arms,
2½ in. Forward Extension

It will pay all manufacturers these times when competition is hot, to see that their wheels are equipped with just the attachments demanded by the rider. Every rider knows the merits of KELLY BARS, as they have been for the past six years the most popular and foremost sundry in the cycle trade.

THE KELLY HANDLE BAR CO.

CLEVELAND, OHIO, - - - - - U. S. A.

THE

Victor Steam Carriage

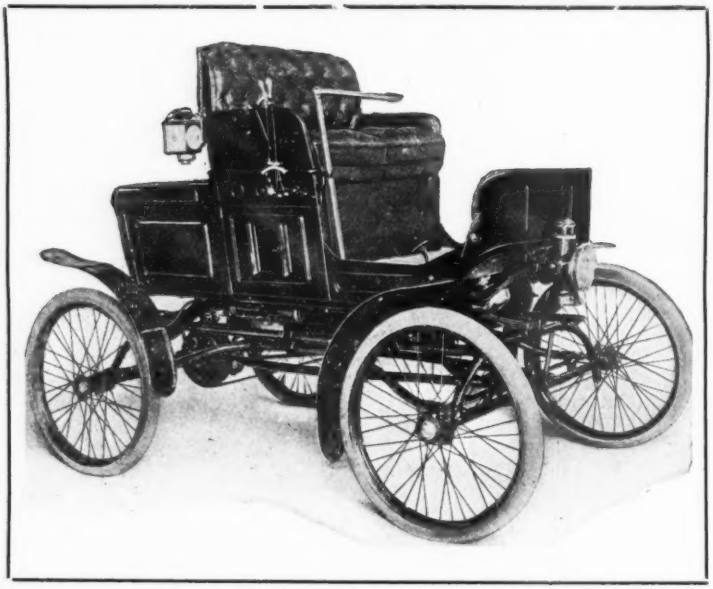
Automatic Water Feed

—o—

Steam Air and Steam Water Pumps

—o—

Steel Body



Feed Water Heater

Fusible Plug to Cut Off Fuel when Water is Low

Enclosed Engine

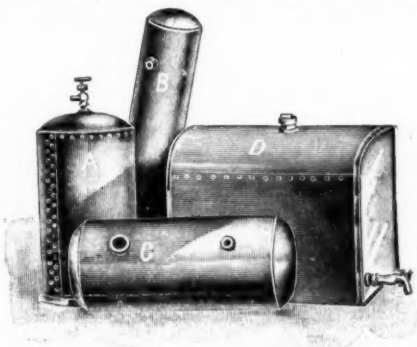
Automatic Throttle Lock

OVERMAN AUTOMOBILE COMPANY, Transit Building, 7 East 42nd St., NEW YORK

SALESROOM, 31 EAST 32 STREET, NEW YORK

INFORMATION FOR PROSPECTIVE PURCHASERS

The coppered steel tanks for air, gasoline or water illustrated herewith are being made and sold by the Gleason-Peters Air Pump Co., Mercer and West Houston streets, New York. They are the latest contribution of this well known house to the automobile trade, special articles for which form no inconsiderable portion of the company's extensive and diversified product. These tanks are made from 20 gauge bessemer hard rolled sheet steel. The seams are lapped, riveted, or turned with solder burned in. A copper plate is deposited on the tanks by a patented electrical process. The inside is tinned with pure block tin. The tanks will stand



a pressure of about 100 pounds, according to size and shape, which can be furnished to any specifications. One style (catalogue D) is made for fastening to the dashboard for carrying an extra supply of gasoline or water, and can be furnished of any dimensions. It has a filler cap on top and a faucet on the end. The stock tank measures 13x6x21 inches and holds seven gallons. The tanks can be covered with leather to match the dashboard. Three of the styles, designated as A, B and C in the company's catalogue, which can be had on application, can be furnished in five days from receipt of order. The list prices range from $7.50 up.

Toledo and Waverley at Chicago

It is no longer a secret that the International Motor Car Co. expects to present at the Chicago show, an exhibit so comprehensive and so elaborately set as to eclipse anything of the sort it has attempted at earlier exhibitions. This was first indicated to MOTOR AGE by the character of a number of inquiries relative to the facilities possessed by the Coliseum and is borne out by details since received from the factory.

The name of this company was so recently changed that the public generally has hardly had time to realize that the great factories at Toledo, where the Toledo steam carriages are built, and at Indianapolis, the home of the Waverley electric, are both included when the International Motor Car Co. is mentioned. The entire exhibit at Chicago is to be artistic, and while each division will have a complete line of vehicles, they will be so arranged that the whole will make a striking display. The general designs are already well along for the booth, and it will be more elaborate than the exhibit at the Madison Square Garden.

The Waverley portion will include a light road wagon of the well known type and a vehicle of similar construction with a phaeton top. A delivery wagon of new design will also be included and a substantial surrey fitted with artillery wheels and otherwise up to date. The Waverley department has under construction a vehicle of entirely new design which is expected will make a sensation. The company will not disclose, at present, just what this vehicle is, but assures visitors that they will be pleased when they see it at Chicago.

The Toledo department will have its standard model A steam carriage, such as is now making the trip through the Grand Canyon and the Yosemite Valley. It is a vehicle of this type that is also making the journey from Toledo to Hot Springs, Ark. De Long and Soules have already reached Paris, Tenn. This is the longest touring trip that has ever been attempted in America and through a country that has never before been attempted by an automobile.

The Toledo exhibit will also include a standard model A, with phaeton top, and a surrey of somewhat improved design, although very similar to the one that attracted so much attention at the Madison Square Garden show. The Toledo Jr. will be a prominent exhibit. This is a neat little vehicle of light construction for general city and town use, to fill the same field for which the other well known light vehicles are designed. The Toledo Jr. is equipped with a boiler the same as that of the regular Toledo model A, except that it is of lighter steaming capacity. The frame is of the well known type previously shown on some of the Toledo models. It is very flexible and the vehicle is very easy riding. The Toledo Jr. weighs about 850 pounds. It is not, of course, designed for heavy touring work, like the standard Toledo, which weighs nearly 1,500 pounds, and which has a heavy frame built of 1¾-inch heavy gauge steel tubing, and wheels fully as heavy as many of the gasoline cars that weigh more.

A new model Toledo that will be exhibited for the first time at the Chicago show is the dos-a-dos. The lines are attractive and it is noticeable that it does not possess the dumpy appearance that some steam vehicles of this type have. Like the Waverley department, the Toledo factory has a sensation in store for the visitors at the Chicago show, but that is another story. The company can supply the demand immediately. A buyer can have his carriage at once.

Spark Coils Made at Syracuse

Under the title Sparks a well prepared booklet has been issued by E. Q. Williams, of Syracuse, N. Y. It is devoted to spark coils of all kinds and for all purposes. The product comprises coils for ignition as well as for X-ray work, the latter being put up in elaborate form. Coils for ignition purposes are made in various sizes, suitable for motor cycles and automobiles and for any style of engine. Style A is furnished with four terminal wires, and is put up in a wood case. Style B is provided with a polished fiber case, the ends being finished with nickel-plated bands, thus giving a neat and attractive finish to the coil. Style E is the bicycle coil, is put up in plain fiber case and has four terminal wires. Any number of terminals or brass binding posts are provided as required. The line is complete and Mr. Williams will take pleasure in figuring with the trade for coils suited for any special purpose.

Good Work of a Thomas Motor

The capabilities of the Thomas 2½ horsepower motor are daily illustrated at and about Hammond, Ind., by an enthusiast who has a 300 pound runabout, constructed of bicycle tubing, and sufficiently large to carry himself and wife. When actively engaged in business the owner uses this machine to cover about 30 miles a day, calling on his trade. He states that he has no fault to find when using the machine alone, but that when carrying two pasengers the power is not sufficient except under the most favorable conditions. As the user is constantly on the go during the week days and must regularly visit his clients, it is safe to assume that the machine is put to severe use and that it serves his purpose in that way is sufficient guarantee of the worth of the motor.

STATE BOARD OF TRADE FIXES TERMS

California Will Have Uniform Repair Prices and Terms of Installment Sales—Result of a Three Days' Debate

Immediately after the adjournment of the late general meeting of dealers at San Francisco to organize a state cycle board of trade the directors met and commenced business in earnest. A committee composed of P. H. Burke, of Los Angeles; E. J. Thiebault, of Oakland, and S. P. Allen, of San Francisco, was appointed to make an endeavor to harmonize repair prices so as to make them uniform all over the state. The conclusions of the committee will be submitted to all the local boards of trade for their approval before final adoption.

After considerable discussion details were arranged as to the basis of selling bicycles and retail prices of tires, which will be found set forth in the tables following:

Minimum rates and maximum time at which installment business will be accepted, and on lease agreement only:

List cash prices.	Installment prices.	Payment before delivery.	Time allowed, months.	Monthly payment.
$20.00	$22.00	$10.00	2	$ 6.00
25.00	28.00	10.00	3	6.00
30.00	34.00	10.00	4	6.00
35.00	39.00	10.00	4	7.25
40.00	45.00	10.00	5	7.00
45.00	50.00	10.00	5	8.00
50.00	55.00	15.00	5	8.00
55.00	60.00	15.00	5	9.00
60.00	65.00	15.00	5	10.00
65.00	70.00	15.00	5	11.00
70.00	75.00	20.00	5	11.00
75.00	80.00	25.00	5	11.00
80.00	85.00	25.00	5	12.00

If at any time customers wish to make full payment in shorter time than contracted for we will accept a proportionate reduction of the installment charge.

Net cash price of tires, castings and tubes put on wheels.

	Each.
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Sixty days' guaranteed tires	3.00
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No. 66 Fisk, No. 70 Hartford, No. 19 Goodrich, Defender special	3.75
No. 88 Fisk, No. 77 Hartford	4.00
Fisk Puncture Proof, Fisk Tandem, No. 80 Hartford, Hartford Special, Hartford Thorn, No. 999 Goodrich, No. 19 Goodrich Tandem, No. 19 Goodrich Anti-Cactus, Cataplero, Milwaukee Puncture Proof, Goodrich M. & W. Special	4.50
G & J, Dunlop, Palmer, No. 999 Goodrich Anti-Cactus	5.00
Palmer Export	5.50
G & J casings, Dunlop casings	3.75
G & J inner tube, Dunlop inner tube	1.75
Goodrich M. & W. inner tube	2.00

If customers purchase any of the above and they are not put on the wheel by the seller, the price is 25 cents less.

M. & W. casings, Goodrich M. & W. casings	2.75

If customers purchase either of the above and they are not put on a wheel by the seller, the price is 50 cents less.

After a three days' session the board adjourned to meet again on the third Tuesday in January, 1903. Before the departure of the delegates, however, a well-attended banquet was held, and the gentlemen present were unanimously of opinion that a great deal of good had been accomplished and that their trouble would be well paid for by the results.

The Werner Motor Bicycle for 1902

The Werner motor bicycle has divided popular favor, in Europe, with machines of the Minerva tpye, which have been described in earlier issues. Formerly the motor was placed in front and the novel machine was once one of the greatest curiosities of Holborn Viaduct, London's "cycle row," where an enterprising dealer kept it, running up and down all day long. Despite predictions to the contrary it attained considerable popularity.

For the coming season the makers have made radical changes. The motor is placed above the hanger, improving the steering and insuring other advantages. In the frame, illustrated herewith, a and b show the space in which the motor is placed. The tube b of the seat mast is joined, as usual to the rear stay c. The tube a is united to b by a cross tube d, parallel to the upper tube of the frame. The motor is fixed in the following way: The gear box e bears at its upper part, which is attached to the cylinder f, two ears, g and h, one of which, g, is plug-shaped and joined to the tube c; the other, h, having the width of the box e, is joined to a fork i, formed at the lower extremity of the tube a.

The motor occupying the place of the crank, the latter has been removed back of the tube C, on the fork c. Its movement is transmitted to the driving wheel by means either of a chain or a bevel-wheel, with a coaster device. The action of the motor is transmitted by the pulleys j and k and the strap l. The governed pulley k is assembled to the rim of the rear wheel, and the tubes m and n are slightly crooked in order to let the pulley k freely revolve.

The motor, fitted with small flanges, has 1¾ horsepower, a bore of 64 mm. and a piston travel of 70 mm. It weighs about 20 pounds. The carbureter, of a new model, is just above the motor. It has an intake regulator and, at its upper part, a quadrant bearing six divisions and allowing the driver to regulate the admission of air. The handles governing the parts are on the upper tube of the frame. The ignition coil is under the saddle. The whole machine weighs about 90 pounds.

Tom Cooper in a Coal Mine

NEW YORK, Jan. 26.—Tom Cooper, champion of 1900, and a partner are working a coal mine of theirs at Montrose, Col. The blonde western cycling crack has always been a prudent money saver and is credited with a considerable fortune, through judicious and lucky investments. This is his latest enterprise and he is devoting his personal attention to it. Cooper, though not as successful as a racer last season as in former years, proved far from a "has been." In a letter to Chairman Batchelder, of the N. C. A. board of control, he shows he still has a hankering for the banked oval paths and that the spring cycling fun may bring him back on the circuit again.

Speaking of his present exile and strenuous life, he says:

"It is quite a change from riding a bicycle to digging for dusky diamonds underneath the ground, but the climate out here in Colorado is simply superb. I am living in a log cabin, 26 miles from a town, and that a town of only 1,300, with communication to it via horseback. Our mines are located 1,100 feet above sea level, and this elevation is a little bit hard on my breathing machinery, but I am feeling really better than ever before in my life. If I get the racing fever again next summer the other riders will have to look out for me.

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A Fournier-Searchmont agent attended the recent Paris Automobile Show "to see if there was a better Automobile on the market than the Searchmont." He made a thorough investigation of all the types shown there and puts his conclusion as follows: **"Take the best French type, simplify it, put better material in it, and you have a Searchmont."** :: Let us send you booklet telling all about the new Searchmont Touring Car. ::

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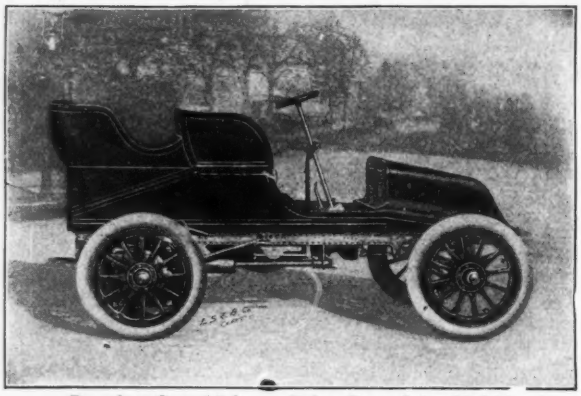

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"There is any amount of hunting, with plenty of bear, deer and mountain lions, besides rabbits, grouse and turkeys. Our score at present consists of two bears and seven deer.

"The first bear I met in the mountains was just about a mile from our cabin, and I wish I had been officially timed for that distance, since I am certain that I made a record on foot. The N. C. A. may expect an application for it in course of time."

The Week's Exportation of Cycles

WASHINGTON, D. C., Jan. 25.—The figures showing the exports of bicycles for the week just ended from the port of New York are as follows: Antwerp, material, $1,310; Amsterdam, $41; Argentine Republic, bicycles and material, $1,271; Brazil, velocipedes, $95; bicycles and material, $262; Berlin, material, $50; Bremen, material, $110; British possessions in Africa, bicycles and material, $6,206; British West Indies, bicycles and material, $364; British East Indies, bicycles and material, $170; British Australia, bicycles and material, $3,447; velocipedes, $65; Cuba, bicycles and material, $225; tricycles, $11; Copenhagen, $4,045; material, $4,714; Cadiz, bicycles, $70; Frankfort, material, $114; Florence, bicycles, $210; Genoa, $54; material $1,755; Gothenberg, material, $387; Glasgow, $110; Havre, $9,300; material, $1,430; Hamburg, $2,560; material, $848; Liverpool, $25; bicycles and material, $708; London, $2,091; material, $4,804; Mexico, $25; Peru, $27; Rotterdam, $870; material, $3,486; Turkey in Asia, $81; Southampton, material, $4,460; Stockholm, material, $1,337; St. Petersburg, bicycles and material, $11,450; San Domingo, bicycles and material, $36; Uruguay, bicycles and material, $144.

Johnson's Business Shows Improvement

Fred Johnson, of the Iver Johnson Arms & Cycle Works, was in Chicago Tuesday and expressed a belief, based on the experience of his concern up to this time, that the cycle trade would be better this year than last. He has been particularly fortunate in California and regards the far west as the best field just at this time. The Johnson factory is producing a novelty in the form of a trussed frame. A tube, in the form of an arc, runs from the head to the seat mast and is brazed at its center to the top tube. The effect is a distinct strengthening of the frame and as a talking point the innovation has been successful among dealers.

Cycle Sport and Trade

Floyd McFarland, the champion high kicker of the cycle racing men, has appealed to the board of appeals for the removal of the fine imposed by the board of control on account of the fiasco at Baltimore and Washington last summer. It was alleged that McFarland agreed to bring a number of racing men and that on account of his failure to do so the promotors were obliged to return the gate money. McFarland has filed a statement, backed by an affidavit, to the effect that he did not make himself responsible for the appearance of the men, but tried to secure their attendance, and that he ought not to be blamed for their failure to carry out the promises they made him.

A very elaborate affair was the annual carnival and fair of the Narraganset Wheelmen, of Providence, which continued throughout last week. It was held at Music hall, which was magnificently decorated. A special program was arranged for each evening, and the club is reported to have benefited largely from a financial standpoint. Social events seem to be the order of the day at Providence. The Pawtucket club has just closed a successful fair, with an attendance of towering proportions, while the Fowler Wheelmen are preparing for a similar event.

The Boston Bicycle Club is the oldest in the country and one of the oldest in the world. It is not very active, and many of the members are in the fossil class, but it does one good to learn that the old officers were re-elected at the last meeting, a week ago, and that Ned Hodges, who for many years owned Bicycling World, is to remain president, Frank W. Weston, one of the oldest cyclists in the world, secretary, and W. G. Kendall, another dyed-in-the-wool veteran, treasurer.

The annual meeting of the Miami Cycle Co. occurred last week, at which Paul Serg was re-elected president and Harry Walburg secretary and treasurer. Statistics published in this paper were presented to show the decrease in the number of factories and the improved condition of those remaining, due to the absence of the competition of makers devoid of financial responsibility.

Assemblyman Brooks, of Buffalo, has introduced a bill at Albany making it legal to conduct 6-day races in which the competitor may ride the whole of the first day and 18 hours per day thereafter. In support of the bill Chairman Bacheldor of the N. C. A. is gathering information relative to the laws of other states.

Eight applicants were admitted to the North End Wheelmen of Albany, N. Y., at a meeting last week, and a committee of twenty members was appointed to make arrangements for the annual masquerade on March 17. O. J. McKee has been elected president of the club and W. Shea secretary.

The members of the Rome (N. Y.) Cyclers held an annual banquet last Saturday, listened to a satisfactory report by the treasurer and elected these new officers: President, Ray Armstrong; vice president, H. W. Barnard; secretary, Leon V. Jones; treasurer, N. C. Gaylord; captain, N. H. Thomas.

The Wabash Cycling Club of Terre Haute, Ind., will celebrate the tenth anniversary of its formation on April 13 with a suitable entertainment. The members are at present in the middle of a billiard tournament in which there are forty competitors.

One of the most successful events of the season at Camden, N. J., was the seventh annual ball of the Camden Wheelmen, in which 150 couples participated. Paul Grisel is the president of the club and A. Irving secretary.

The Rhode Island state house, now in course of erection at Providence, will have cycle racks for several hundred machines. That doesn't indicate a falling off of interest in the sport in Rhode Island.

The Genesee (N. Y.) Cycle club recently elected Isaac Bogart president and Joseph Sochner secretary. A banquet was held, at which 60 members were present, at the clubhouse, 409 Hudson avenue.

The Meriden (Conn.) Cycle Club has engaged the town hall for the evening of Feb. 10 for a masked carnival and the best talent has been called upon for a supply of entertainment.

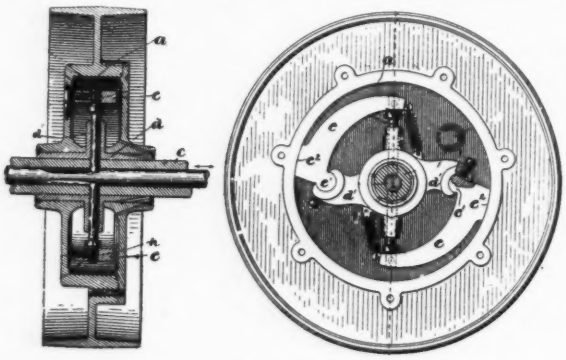
At its last meeting the Lebanon (Pa) Cycle Club elected William T. Atkins president and Frank E. Krause secretary. Fourteen members were admitted.

Behrens & Bushnell, of Ivoryton, Conn., have fitted up a new cycle store in which they will commence operations at once.

The national assembly of the L. A. W. meets at Torrington, Conn., on Feb. 12.

THE WEEK'S ISSUE FROM THE PATENT OFFICE

A vital feature in gasoline vehicles is the method of connection between the motor and the transmission gearing and as it should properly be more or less flexible the friction form of clutch will probably retain its supremacy and anything in the way of an improvement in that form will be of interest. Carl M. Wheaton, of Newton, Mass., is the patentee of a clutch that, while not particularly intended for automobile use, is readily applicable thereto



and has the appearance of a thoroughly effective device. Several modifications are shown but the one illustrated is closely allied to the others.

The clutch comprises an outer member, which is of annular form and has an internal circular friction face a, which is concentric with the axis of the shaft. The internal friction face, a, is the inner surface of a casing which forms part of a loose pulley or gear wheel, as may be desired, which is journaled to rotate freely on the projecting hubs of the inner portion of the clutch. One side of this case is removable in order to allow of access to the inner mechanism of the clutch and is secured to the right portion of the case by means of bolts near the periphery thereof. The inner member of the clutch includes a holder, d, which is rigidly affixed to the shaft c.

Oppositely located on the holder, d, are two lugs, d, which form seats or fulcrums for the clutch levers, e. The levers, e, of which there are two, are each provided with a fulcrum boss, e, formed on what may be termed the inner end of the lever, said boss fitting a corresponding socket in the adjacent arc, d. Each lever has a friction face, e2, formed to cooperate with the internal friction face, a. The friction face of the lever is much shorter than the total length thereof, being preferably about one-fifth the total length of the lever. By making the friction faces of the levers thus relatively short and locating them near the inner or fulcrumed ends of the levers the contact surfaces are reduced and the result is a correspondingly increased clinging power when the levers are pressed against the friction face, a, by the means provided therefor.

This small area of contacting surface would cause abrasion and rapid wear of the friction surfaces were it not that ample means are provided for lubricating said surfaces, the internal surface, a, being, in fact, the outer wall of an oil-chamber, the outer walls of which are formed by the side pieces and hub portions of the casing. The means employed for forcing the outer ends of the levers outwardly to engage the friction surfaces comprise, in the form illustrated, radial lifting pins or struts, which in this construction must be seated in holes but little larger than the pins, as the walls thereof must serve to guide the pins in their radial movement.

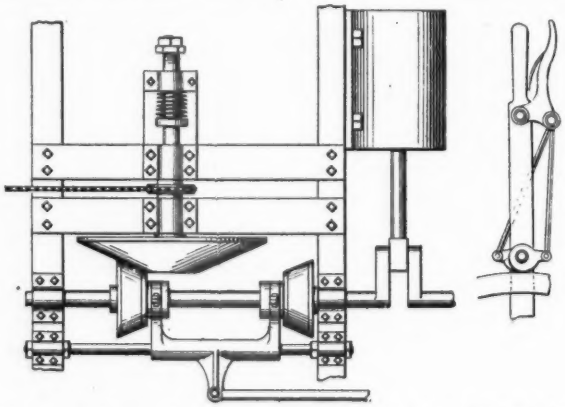
The main shaft is tubular, for a distance at least, and in the bore thereof is seated a rod, the sides of which are cut away, forming a wedge so that by a longitudinal movement of this rod the radial pins are forced outwardly, thereby pressing the friction-surfaces of the levers against the inner face, a, and putting the clutch into operation. To assure the immediate release of the clutch, when desired, tension springs are secured between the arms, d, and the outer ends of the levers, e, thereby drawing them inwardly and out of engagement as soon as the wedge is moved to a position to release the outward pressure from the radial pins.

In a modification the radial pins are arranged to provide a toggle connection between the slidable rod and the levers, the method of operation being the same as with the wedge. To provide for the adjustment which may be necessary owing to wear or other reasons the outer ends of the radial pins are seated in screws threaded into the arms of the levers and held against accidental movement by binding screws located perpendicularly thereto.

One side of the clutch case is provided with an opening with a removable cover, whereby access to the inner members of the clutch is provided for. By the formation of the inner members of the clutch the pressure of the friction surfaces of the levers is in the same direction as the resistance of the load, hence the tendency is to increase and assist the frictional contact so that undesirable slippage is avoided.

Leech & Evans' Driving Gear

Charles M. Leech and Seymour D. Evans, of Lima, O., are designers of a frictional driving gear in which attention is given to avoiding the sliding motion between the wheels owing to the variance in the speed along the line of contact. The driving and driven wheels are conical in form and the angle of contact is such that when the wheels are set in the relation most commonly used there is no sliding action whatever and at other times the sliding action is but slight compared with that found where the wheels are set in the usual manner, with the faces parallel with one shaft and perpendicular to the other. Two driving wheels are used, giving a forward and reverse speed and the driven wheel is longitudinally movable in its bearings against one of the pillow blocks



of the bearings. A novel operating lever is used which is locked in position by two cams resting upon a quadrant and actuated by a finger lever. The form of the cams is such that voluntary action in either direction is prevented and the lever may be locked at any point on the quadrant with the use of notches.

A Freaky Device and Waste of Money

Some of the driving mechanisms proposed for use in motor vehicles are fearful combinations of apparatus, valuable in other combinations and for other purposes

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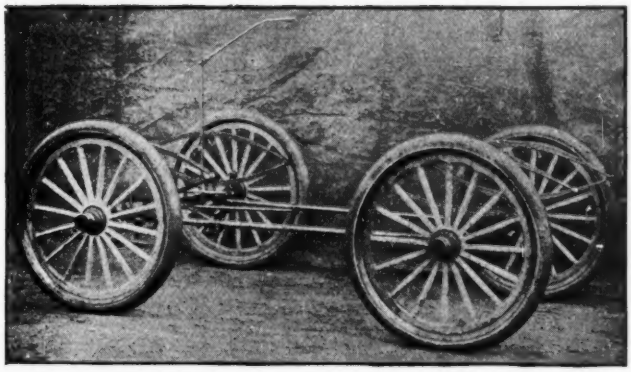

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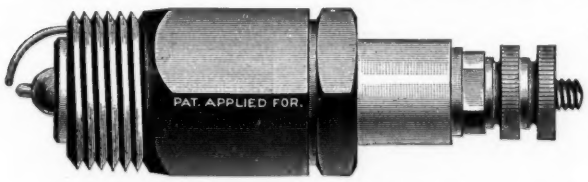

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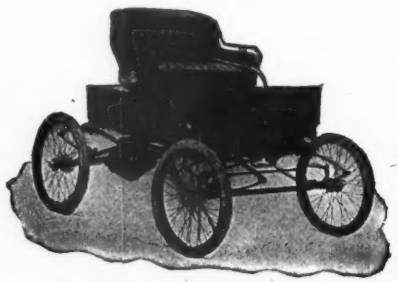

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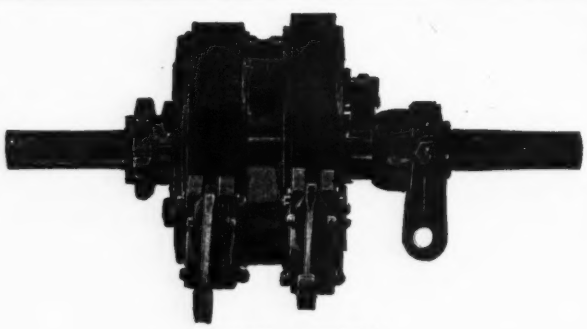

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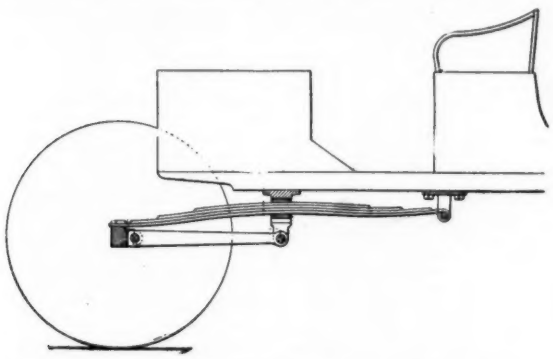
but utterly worthless in the combinations and for the purpose suggested. One of the latest of these is a device designed by Karl Schiller, of Austria, and on which he has gone to the extent of taking out an American patent. Having probably seen, but not being familiar with, the details and principles of a hydraulic press, wherein enormous pressure is obtained by use of a pump of small dimensions, this gentleman has designed a motor vehicle in which the driving mechanism comprises a reservoir in which water or other liquid is forced by a pump designed to be manually operated by means of a foot lever or pedals. From the pressure thus obtained it is proposed to drive a motor which in turn provides the motive power of the vehicle. If the misguided inventor had been able to build a machine embodying his ideas the patent would probably never have been applied for.

Screw-Actuated Steering Gear

Recent issues from the patent office have in several cases covered steering mechanisms wherein the operating device has comprised a screw thereby preventing reactionary movement. One of the most recent of these is issued to Franklin R. Heister, of Centerport, Pa., and contains no radical features. The front axle is of the usual type with knuckles fitted with steering arms and held in proper relation to each other by connecting rods extending outwardly from a centrally located bell-crank pivotally secured to the axle. This bell-crank is operated by a screw threaded rod on which is seated an internally threaded bevel pinion. This pinion is actuated by a system of gears in connection with a hand lever operating a geared segment or by a hand wheel as preferred.

Daimler Spring Attachment

Wilhelm A. Maybach, of Cannstadt, Germany, to whom has been issued a number of United States patents, all assigned to the Daimler Mfg. Co., of New York, is the designer and patentee of a vehicle spring for use with automobiles. The object of this invention is to so arrange the springs in respect to the axle and vehicle body that the extreme forward ends of the springs will rest upon the axle while the rear ends of the springs are connected with the vehicle body, and the weight of the body is carried by the center of the spring. A leading feature of the device is that the greater portion of the spring is under the vehicle even when the front axle is placed considerably in advance of the front of

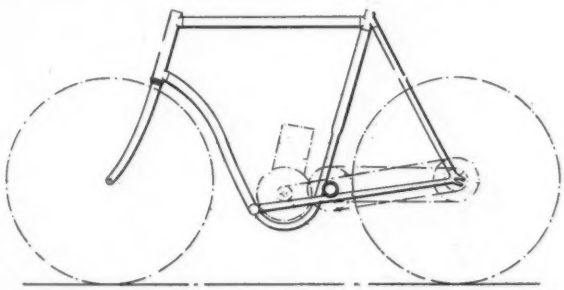


the body as is a common case in modern construction. The springs are semi-elliptical in form and are secured at their rear ends to brackets secured to the under side of the body while the forward ends rest upon the axle. The axle is provided with ribs which confine the spring laterally but allow of a longitudinal movement thereof.

The leaves of the spring are confined at the center by a strap, the upper surface of which is rounded and rests against a bearing on a bracket secured to the under side of the vehicle body. This bracket has arms which prevent the displacement of the spring and these arms are extended downwardly to form bearings for a purpose to be later described. Rearwardly extending arms are pivotally secured to the front axle, their rear extremities being pivotally secured to the center brace by pivots passing through the arms thereon in the bearings above described. The connection at the front ends of these arms is in the form of a universal joint so that one wheel may be raised higher than the other without causing a racking strain on the arms of their connections. A point on which stress is laid is that even should one or both of the springs break the extreme forward end of the vehicle body would rest on the arms and would be supported thereby, thus avoiding serious accidents.

The Frame of the Patee Motor Bicycle

Hiram H. Peirce, of Indianapolis, Ind., has been granted a patent, which is assigned to Annie W. Patee, of the same place, and is readily recognized as covering the frame of the Patee motor cycle. This frame is



clearly shown in the illustration and requires but little description. The principal characteristic is the location of the motor. The rear forks are carried forward of the seat-mast and are joined to the lower frame tube, which is carried below the crank bracket, forming a pocket, within which the motor is secured.

A Question About Hot Tube Ignition

GREENVILLE, TEX., Jan. 23.—Editor MOTOR AGE: Please explain why a gasoline engine, fired by hot tube, doesn't explode the mixture before the end of the compression stroke. Can you inform me where to get castings to build a light 4 to 6 horsepower motor for carriage work?—T. H. STRUNK.

The time of ignition varies in accordance to the temperature of the tube, its position in relation to the intake and the compression of the mixture. If the tube is at a very high temperature the compression high and the mixture good, ignition will take place early. If compression is low it will cause delay in the explosion. That is, it will not allow combustion to begin until the highest point of compression has been reached and thus will not give the power the charge of gas would be capable of giving under more favorable conditions. The following concerns, among others, handle castings for motors: The Lowell Model Co., Lowell, Mass.; P. J. Dasey Co., 19 LaSalle street, Chicago; A. L. Dyke, St. Louis, Mo.; Palmer Bros., Mianus, Conn.

The automobile mail collection and delivery service, which was to have commenced at Minneapolis with the first day of the year, was started on a limited scale last week when the first of the five machines ordered made its initial run. So far it has been operated with perfect satisfaction to the postoffice authorities.

PECULIAR FEATURES OF GAS ENGINES

THERE is one machine, says Albert Stritmatter in the American Manufacturer, which is gradually becoming more and more popular and which is probably as nearly automatic as any other piece of machinery in common use which performs an equal amount of service. The machine is the gas or gasoline engine. There are thousands of them which are oiled and started in the morning and run all day without a hitch and with practically no attention. This has led to a condition of affairs which is unsatisfactory to the manufacturer as well as a source of much trouble on the part of the users. The idea has become prevalent that because a gasoline engine requires little attention it does not need intelligent attention. Too frequently the operator is like a little boy who went to bed without saying his prayers. When his attention was called to his apparent forgetfulness, he said, "No, I didn't forget. I'm not going to say my prayers tonight nor tomorrow night, and if I get along all right I'm not going to say them at all any more." So, the gasoline engine operator says: "I'll not clean the engine up this morning or make any adjustments today, and if I get along all right, I'll not give it so much attention any more." The result is that he is in trouble.

* * *

One of the simplest things about a gasoline engine is the common, ordinary check valve which is placed in the gasoline suction pipe. Yet this little valve is frequently the cause of much annoyance and expense. Many a time the gasoline pipe is not cleaned out well when it is put up and pipe scale gets loosened and into the check valve, not permitting it to seat, and immediately there is trouble. Frequently, too, shavings from the gasoline barrel get into the tank and are sucked up, causing the same trouble.

* * *

Recently there came to my attention a unique trouble with this simple valve. A man had an engine for quite a long time and had no trouble with it. As he was getting along all right, he did not study the engine as he should have done, and one day he began to have trouble and could not locate the cause. He sent for a man who looked the engine over and decided that the trouble was in the gasoline suction pipe. He started to take this down and on examining the check valve found a dead fly caught in it, which of course prevented the valve from seating. When he called the operator's attention to this fly the man said, "Why, I saw the fly in the gasoline the other day when I poured it into the tank, but I did not think a little thing like a dead fly could stop the engine or cause any trouble." It cost him about $15 to learn that dead flies, as well as live ones, cause trouble.

* * *

In another case the suction pipe was very long and the erector was fearful that the pull would be too great for the gasoline pump, so he exercised great care in cleaning and testing each piece of pipe as it was put up. After installing it, he gave it hydraulic test which showed that the pipe line was tight. On trying to draw gasoline, however, none could be brought up. He started to take down the pipe, which was galvanized instead of the ordinary black pipe. After a while he came to a piece about 10 inches long and suddenly remembered that of all the pipe put up, this one piece had not been tested. When he took it down he found an obstruction in it, caused when the pipe was galvanized, and this of course prevented the gasoline from passing up from the tank.

* * *

Frequently complaints are made of gasoline engines using too much fuel. Often an investigation results in the discovery that there is a leak in the tank, which, while tight before being shipped, has been thrown around en route. The engine is accordingly accused of using a large quantity of gasoline which never reaches it. One man recently complained that his engine got so much hotter than it formerly did that the paint actually smoked after the engine had run a few hours. An expert was sent and he found that they had used muddy water for cooling the engine and that the lower half of the cylinder jacket had become baked hard with mud which had accumulated and which could be removed only by a hammer and chisel.

* * *

Once in a while a man will take his piston out of the cylinder and discover a small hole nearithe open end at the bottom of the cylinder. He writes to the manufacturer stating his cylinder is blown open and receives in reply the information that the hole referred to is merely the auxiliary exhaust port and is not the result of explosion. In another case, black smoke rolled out of the exhaust pipe. This was due to the too plentiful use of lubricating oil, as the cylinder lubricator was wide open and the oil was used up very rapidly. By a simple adjustment of the fuel of the oil, the smoke ceased and there was no further trouble. The continuance of the use of too much lubricating oil, however, would have soon caused other trouble, as the unburned oil will smoke and gum up the exhaust valve, etc., and cause them to work hard and wear from the strain on them.

* * *

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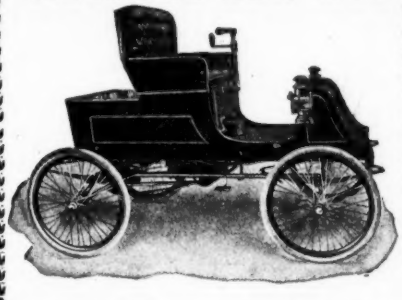

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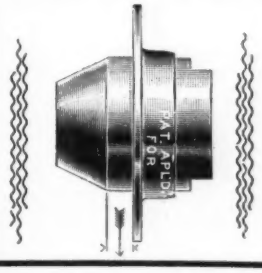

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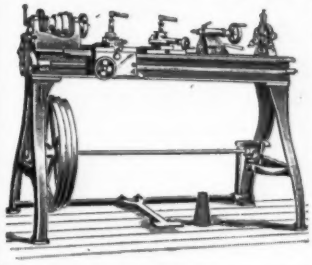

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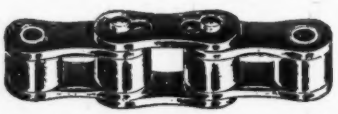

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With the throttling type of engine, however, there are two styles to be considered. First, there is the type where the ratio of gas or gasoline to air remains constant, only the quantity of the charge being varied. In this, of course, the proportion of air to the fuel is always the same, but if the load gets too light the charge is reduced in size. In the other form the air remains constant and the amount of gas or gasoline is varied with the load. With this there is only one point at which a maximum explosion is secured, and as the supply of gas or gasoline is reduced the force of the explosion is also reduced. In these two latter types it is seen that the fuel consumption is increased, but the manufacturers claim that this is overbalanced by the increased regularity in speed by gaining an impulse at every other revolution, as compared with the hit-and-miss engine which must have a very sensitive governor to give a regularity of speed.

* * *

But aside from the fuel consumption, there are other evils resulting from the improper feeding of the fuel. When the charge is so rich that it will not easily ignite, i. e., may sometimes ingite and sometimes fail, there results exhaust pipe explosions. One charge may not be ignited and is exhausted unburned. The next charge may ignite and the large, hot flame from it when exhausted will ignite the charge previously exhausted and cause the explosion in the pipe. This may also occur from a charge which is a little too weak to be ignited every time. These explosions in the exhaust pipe, while not ordinarily dangerous, are somewhat terrifying to one who does not know from what causes they occur.

* * *

If too much fuel is being fed there is a great deal of smoke and soot formed by the unconsumed fuel. This deposits on the igniter points, causing failure to ignite. If there is an auxiliary exhaust port, it deposits in this and mixing with the lubricating oil forms a gummy, sticky mass, partially or entirely filling up the port and causing back pressure in the cylinder. I have known of instances in which this condition had actually existed so long that the auxiliary ports were almost entirely filled. The result was that the burned gas did not entirely escape and fouled the incoming charges to such an extent that very weak explosions resulted, aside from the fact that many of the charges would not ignite at all. This unconsumed carbon also deposits on the exhaust valve and seat, the valve stem, etc., and these parts become so gummed up that the valve works stiffly, does not seat properly, and therefore needs frequent regrinding to hold the compression.

* * *

When to this condition of too much fuel supply is added that of too much lubricating oil, matters become still worse. And it is generally the case that the man who gives the engine too much fuel, gives it too much lubricating oil. The result is that the surplus works back into the combustion chamber and is partially burned. It then desposits in the auxiliary exhaust port, on the exhaust valve, stem, etc., as described of the excessive fuel supply. The result is that when this condition exists there is sometimes some doubts in the mind of the operator as to whether he is feeding too much fuel or too much lubricating oil, or both. The best thing to do is to cut down the fuel supply. If this is the sole cause, the smoke from the exhaust will soon cease. If it continues, cut down the supply of lubricating oil. As there will be considerable oil in the cylinder, there will continue to be a smoky exhaust until this surplus is burned out. Of course, the exhaust valve should be taken out and cleaned well, also the exhaust port should be cleaned out.

* * *

In this connection it might be well to say that only special gasoline engine oil should be used in the cylinder. As one writer says on this subject: "The very best grade of cylinder oil used in steam engines is about the worst thing that can be used in the cylinder of a gas engine, for the reason that it clots and carbonizes from the intense dry heat." Good gas engine cylinder oil costs less than steam engine cylinder oil, and, as above stated, it is the only thing to be used for that purpose, as it is made to stand the enormous dry heat of the gas engine cylinder. The igniting mechanism in the cylinder head, if there is any which is exposed to the intense heat of the cylinder, should also be oiled with this grade of oil. Good machine oil is good enough for the other parts of the engine and will answer every purpose. Above all things, never use filtered oil for the cylinder or crank pin, unless you are absolutely sure that no particles of dirt or grit are in it. This should be carefully borne in mind, as many engines have been ruined by using filtered oil which contained gritty dirt. Of course, everyone knows that if too little lubricating oil is used there will be disastrous results. The bearings will get hot and the cylinder and piston will heat and cut and there will be no end of troubles.

* * *

While this question of lubricating oil apparently has not much to do with the question of fuel supply, I have been led to refer to it here because the two are so closely related to the proper results to be obtained from a gas engine, and because where one is not properly attended to it is very often the case that the other is not. It will therefore be seen that the questions of proper adjustment of the supply of fuel and of lubricating oil are questions of importance to those who are desirous of obtaining the best results. Proper attention to these points will result in efficient and reliable power at a very low cost, and will add several years to the life of the engine. It will also save much time which would otherwise be spent in trying to get the engine to run when it was in no condition to do so. To these beneficial results should also be added the additional comfort and freedom from worry of the operator and his therefore increased usefulness.

is frequently trouble. The cause of this is as follows: In warm or moderate weather a priming charge of a certain quantity of gasoline is drawn into the engine. Most of this remains in the vapor form and forms with the air in the cylinder the first explosive charge. In very cold weather, however, the cylinder is exceedingly cold and frosty. If the same amount of gasoline is drawn in for the priming charge that is used in moderate weather, the greater portion of it is condensed, not leaving enough in vaporized form to make an explosive charge, so that it does not ignite from the spark or tube. The remedy for this is to use a larger quantity of gasoline for the priming charge, so that enough will be vaporized to ignite and start the engine.

* * *

On the other hand, suppose the engine has been running for several hours and has gotten very hot and it is then shut down for a short time. If, on attempting to start while it is still hot, the same charge is used as in cold or even in moderate weather, there is more of it retained in the vapor form and none or practically none of it is condensed. This forms a mixture which is too rich to ignite. As the difficulty results from a condition the reverse of that when the cylinder is cold, the remedy will of course be to use less gasoline for the starting charge. All gasoline engine manufacturers are now receiving frequent complaints about the difficulty in starting in cold weather and the reasons given above will explain the cause of the difficulty, which is not found with merely one make of engine, but with all makes alike. In fact, all of the difficulties which have been mentioned are as likely to occur with one make as another.

* * *

I will venture to say that of all the trouble had with gas and gasoline engines, perhaps 10 percent may be attributed to cheaply built and poorly designed engines. The fact that there are in the neighborhood of a hundred new engines put on the market every year and that of these only a very few of each type are built and that a still smaller number of these different makes are continued on the market for over a year, shows that an estimate of 10 percent is probably not excessive. Of the other 90 percent of the troubles probably all but 1 or 2 percent are due to lack of intelligent attention. The remaining 1 or 2 percent may be called "accidental troubles," due to carelessness on the part of the manufacturers, as for instance an occurrence within the last year where a painter had painted two polished parts of an engine. The paint dried and stuck the two parts together, and the purchaser not being familiar with the engine had some difficulty in locating the trouble. Such "accidental troubles," I estimate from 1 to 2 percent, which I consider sufficiently high. At any rate, the percentage of troubles caused by defects in the machines is very small as compared with the trouble due to lack of information on the part of the operator. So much larger is the number of troubles due to improper care that the following instruction by a prominent builder does not seem to be out of place: "Don't forget that nine times out of ten when the engine will not run you are at fault. Look around and see what you have forgotten."

* * *

It is not so commonly recognized as it should be that what is usually called a gas or a gasoline engine is in reality a gas and air or gasoline and air engine. In other words, it is not usually recognized that such types of engines must have air as well as gas or gasoline. The importance of the air will be seen when it is remembered that for gas or gasoline to burn or explode there must be a certain amount of air or oxygen present. The force of the explosion, therefore, varies according to the proportion of air to gas or gasoline. A ratio of one volume of gas to seven volumes of air is considered to give the strongest explosion, although anywhere from one of gas to from three to fifteen of air will make a strong explosion, depending on the quality of the gas used. As gas varies so greatly in the number of heat units it contains, the best ratio cannot be determined without a knowledge of the quality of the gas under consideration.

* * *

As the economical consumption of fuel in the ordinary commercial gas engine is of very great importance, it may be well to consider some of the effects of the wrong adjustment of the fuel supply. Of course, in the so-called throttling engines, the ratio of the gas and air is not supposed to be under the control of the operator. Suppose we have an engine of the hit-and-miss type, burning with the mixtures of fuel the proportion of gas or gasoline to air which gives the strongest possible explosion. The engine will therefore get the most power possible from each charge and will take as few charges as are necessary to maintain the speed. We thus have a maximum of power from a minimum of fuel, the condition desired.

* * *

Suppose, however, the operator thinks he has not power enough and he will give it more fuel to get additional power. This is a pretty common method of procedure, but a very erroneous one, for the following reason: By increasing the amount of gas or gasoline he has a richer mixture of fuel. In other words, if he has been running on a ratio of one volume of gas to seven of air, he may now have one of gas to only four or five of air. The mixture is therefore getting more gas than there is air to unite with to give the strongest explosion. If the gas supply is still further increased, it may make so rich a mixture that the spark will fail to ignite the charge altogether. That is, as the amount of gas increases, the volume of air of course not being increased, the weaker is the explosion, until finally the charge will not ignite at all from the comparatively small spark in the cylinder, although it might ignite if a burning match or torch were held to it.

* * *

On the other hand, suppose the operator thinks he is using too much fuel and therefore cuts it down. As he does so, the charge gets weaker and weaker until it, too, will not ignite, there not being enough gas or gasoline to take fire from the spark.

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